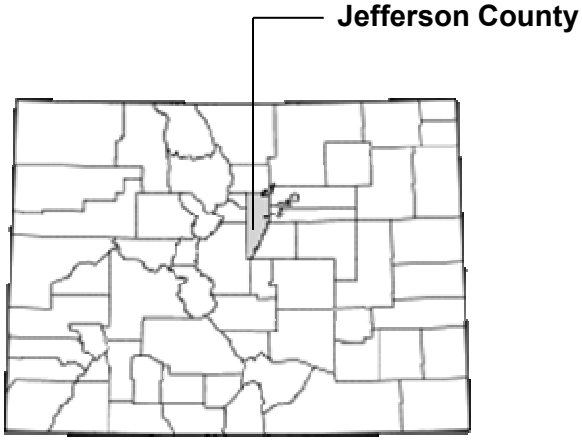
FLOOD INSURANCE STUDY

VOLUME 1 OF 8

JEFFERSON COUNTY, COLORADO
AND INCORPORATED AREAS



Community Name	Community Number
ARVADA, CITY OF	085072
BOW MAR, TOWN OF*	080232
EDGEWATER, CITY OF	080089
GOLDEN, CITY OF	080090
JEFFERSON COUNTY (UNINCORPORATED AREAS)	080087
LAKESIDE, TOWN OF*	080311
LAKEWOOD, CITY OF	085075
MORRISON, TOWN OF	080092
MOUNTAIN VIEW, TOWN OF*	080254
WESTMINSTER, CITY OF	080008
WHEAT RIDGE, CITY OF	085079

*NO SPECIAL FLOOD HAZARD AREAS IDENTIFIED

REVISED
DECEMBER 20, 2019

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
08059CV001D

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this Flood Insurance Study may be revised and republished at any time. In addition, part of this Flood Insurance Study may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the Flood Insurance Study. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current Flood Insurance Study components.

Initial Countywide FIS Effective Date: June 17, 2003

Revised FIS Dates: February 5, 2014

January 20, 2016

December 20, 2019

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FLOOD INSURANCE STUDY

JEFFERSON COUNTY, COLORADO, AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Jefferson County, including the Cities of Arvada, Edgewater, Golden, Lakewood, Westminster, and Wheat Ridge; the Towns of Bow Mar, Lakeside, Morrison, and Mountain View; and the unincorporated areas of Jefferson County (referred to collectively herein as Jefferson County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

Please note that the Cities of Arvada and Westminster are geographically located in Adams and Jefferson Counties. The Town of Bow Mar is geographically located in Arapahoe and Jefferson Counties. The Cites of Arvada and Westminster and the Town of Bow Mar are included in their entirety in this FIS report.

Please note that no Special Flood Hazard Areas have been identified within the Towns of Bow Mar, Lakeside, and Mountain View.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence, and the State (or other jurisdictional agency) will be able to explain them.

The Digital Flood Insurance Rate Map (DFIRM) and FIS Report for this countywide study have been prepared using digital data. Flood hazard information was converted to meet the Federal Emergency Management Agency (FEMA) DFIRM database specifications and geographic information standards and is provided in a digital format so that it can be incorporated into a local Geographic Information System (GIS) and be accessed more easily by the community.

1.2 Authority and Acknowledgments

The sources of authority for this FIS report are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analysis for the January 2016 partial map revision was completed in January 2012 by Wright Water Engineers, Inc, as part of an update of the

Major Drainageway Plan and Flood Hazard Delineation for Big Dry Creek (Reference 112), which updated the analyses for Big Dry Creek.

The hydrologic and hydraulic analyses for the original study for the City of Arvada (Reference 1) were performed by Greiner Engineering Sciences, Inc., for the Federal Emergency Management Agency (FEMA) under Contract No. EMW-83-C-1173. This work was completed in July 1989.

The hydrologic and hydraulic analyses for the original study for the City of Edgewater (Reference 2) were performed by the IJRS Corporation and completed in December 1986 and 1977 (References 3 and 4).

Except as outlined below, the hydrologic and hydraulic analyses for the original study for the City of Golden (Reference 5) were performed by PRC Engineering Consultants, Inc., for FEMA, under Contract No. H-4724. This work, which was completed in January 1982, covered all significant flooding sources affecting the City of Golden.

The hydrologic and hydraulic analyses within the City of Golden for Cressmans Gulch, Cressmans Gulch Old Channel, Tucker Gulch, Kenneys Run, East Fork Kenneys Run, West Fork Kenneys Run, West Fork Kenneys Run Tributary No. 1, North Fork of West Fork Kenneys Run Tributary No. 1, West Fork Kenneys Run Tributary No. 2, and Deadman Gulch were performed by Muller Engineering Company, Inc. (Reference 6).

The original study for the unincorporated areas of Jefferson County (Reference 7) was completed in August 1983, by Gingery Associates, Inc., for FEMA, under Contract No. EMW-C-0692. Hydrologic and hydraulic analyses for many of the streams were completed as parts of previous floodplain studies and were expanded by Gingery Associates, Inc.

The study for the unincorporated areas of Jefferson County was revised to incorporate the effects of revised hydrologic and hydraulic analyses for portions of Bear Creek and North Turkey Creek (Reference 8). The report, entitled "Alternate Hydrologic Analysis for the FIS for the Unincorporated Areas of Jefferson County, Colorado," prepared by Messrs. D.M. Thomas and John F. Miller, for FEMA, was utilized as the basis for the revised hydrologic analyses on Bear Creek and North Turkey Creek. The revised hydraulic analyses, completed in March 1988, were performed by Michael Baker, Jr., Inc., as the Technical Evaluation Contractor for FEMA. The restudy also included the results of a previously issued Letter of Map Revision (LOMR) for Coon Creek (December 4, 1987).

The original study for the City of Lakewood was prepared by the U.S. Army Corps of Engineers (USACE), Omaha District, for the Federal Insurance Administration (FIA) under Interagency Agreement No. IAA-H-8-71 (Reference 9). The study covered all suspected flood hazards and areas within the City of Lakewood (Reference 10).

The hydrologic and hydraulic analyses for the original study for the Town of Morrison (Reference 11) were performed by PRC Engineering Consultants, Inc., for FEMA, under Contract No. H-4724. This work, which was completed in December 1979, covered all significant flooding sources affecting the Town of Morrison.

The hydrologic and hydraulic analyses for the original study for the City of Westminster (Reference 12) were performed by Greiner Engineering Sciences, Inc., of Denver, Colorado, for FEMA, under Contract No. EMW-83-C-11-73. This study was completed in June 1985.

The study for the City of Westminster (Reference 13) was revised to incorporate the effects of the new hydrologic and hydraulic analyses resulting from the construction of the Eighth Green and Lowell detention ponds. The reach of Middle Branch Hylands Creek to approximately 600 feet upstream of Lowell Boulevard was reanalyzed by Kiowa Engineering Corporation, Denver, Colorado (Reference 14).

The study for the City of Westminster was revised (Reference 15) to incorporate the results of three previously issued LOMRs including the following: Airport Creek (July 1, 1991), Little Dry Creek and Shaw Heights Tributary (April 6, 1992) and Airport Creek and Little Dry Creek (September 13, 1988).

The study for the City of Westminster was revised (Reference 16) to incorporate the effects of new hydraulic analysis for a portion of Big Dry Creek (Reference 17). The results of a previously issued LOMR were also incorporated for Walnut Creek (March 15, 1994).

The original study for the City of Wheat Ridge was prepared for FIA by the USACE, Omaha District, under Interagency Agreement No. IAA-4-8-71 (Reference 18). The study covered all suspected flood hazards within the City of Wheat Ridge (Reference 19).

The base map information for this study was provided by the Jefferson County Assessor's office located at 100 Jefferson County Parkway, Golden, Colorado 80419. Other Federal agencies such as the United States Geological Survey (USGS) also provided publicly available base map data. The scale of the base map data is 1:24,000 or better as of January 2008.

The projection used in the preparation of the FIRM is Universal Transverse Mercator (UTM) Zone 13N. The horizontal datum is NAD83. Differences in the datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of the FIRM.

1.3 Coordination

An initial Consultation Coordination Officer (CCO) meeting (also occasionally referred to as the Scoping meeting) was held March 31, 2011 in Golden, Colorado, and attended by representatives of the communities, FEMA, the State, and the study contractor to explain the nature and purpose of the FIS and to identify the streams to be studied by detailed methods. A final CCO (often referred to as the Preliminary DFIRM Community Coordination, or PDCC, meeting) is held with representatives of the communities, FEMA, and the study contractors to review the results of the study.

For this 2019 revision of the countywide FIS, the final CCO meeting was held March 30, 2017 to review and accept the results of this FIS. Those who attended this meeting included representatives of Urban Drainage Flood Control District (UDFCD), the Study

Contractor, FEMA, and the communities. All problems raised at that meeting have been addressed in this study.

For the January 2016 revision of the countywide FIS, the final CCO meeting was held on May 29, 2014 to review and accept the results of this FIS. Those who attended this meeting included representatives of Urban Drainage Flood Control District (UDFCD), the Study Contractor, FEMA, and the communities. All problems raised at that meeting have been addressed in this study.

The following Consultation Coordination Officer (CCO) meetings were held to review and supplement the results of original and revised studies.

City of Arvada

On April 25, 1983, an initial CCO meeting was held with representatives of FEMA, the City of Arvada, the Urban Drainage and Flood Control District (UDFCD), the Colorado Water Conservation Board (CWCB), and the study contractor. Coordination with City officials and Federal, State, and Regional agencies produced a variety of information pertaining to floodplain regulations, flood history, and other hydraulic and hydrologic data. Because a number of unexpected problems occurred with the contract and preparation of the study, a lengthy delay resulted and a "restart" meeting was held with the CCO and the City of Arvada on February 23, 1987. This meeting was held in order to get the project back on track and to revise the stream study limits and the level of study detail to be performed.

The City of Arvada, UDFCD, and the FEMA Region VIII office were contacted and supplied information used in the preparation of the study.

On January 29, 1991, the results of the study were reviewed and accepted at a final CCO meeting attended by representatives of the community, FEMA and the study contractor. The study was acceptable to the community.

City of Edgewater

On September 22, 1988, the results of the study were reviewed and accepted at a final CCO meeting attended by representatives of the community and FEMA.

City of Golden

Information was obtained from the City of Golden; the UDFCD; the State Engineers Offices; the U.S. Geological Survey (US GS); the USACE, Omaha District; and several other State and Federal agencies.

Liaison was maintained with officials from the CWCB, UDFCD, and Jefferson County. As a result of communication with these agencies, information was exchanged, hydrologic methods were established, and a general coordination of work efforts in the area was achieved.

An initial CCO meeting was held in Golden on April 1, 1976, between FEMA and community officials to discuss the purpose and scope of the FIS.

A final CCO meeting was held on July 12, 1983, and was attended by representatives of FEMA, the study contractor, and the city. All problems raised at that meeting have been resolved in the study.

Jefferson County (Unincorporated Areas)

Streams requiring detailed and approximate study were identified at a meeting attended by representatives of the study contractor, FEMA, Jefferson County, the UDFCD and the CWCB on July 29, 1981.

Assistance in obtaining data was provided by the UDFCD and Jefferson County. Additional funding was provided by the UDFCD to update selected reaches of their previous floodplain studies for incorporation in the FIS. Additional assistance in the form of field surveys was provided by the county.

The final CCO meeting for the original study was held on February 6, 1985, and was attended by representatives of FEMA, the study contractor, and the county. No problems were raised at the meeting.

Town of Morrison

Contacts were made with, and information was requested from, the Town of Morrison; the USACE, Omaha District; the Colorado State Archives; and other State and Federal agencies.

Liaison was maintained with the CWCB and the UDFCD (which includes Denver and the urban portions of Jefferson County and other surrounding counties) to obtain information on state floodplain regulations and to ensure coordination of work efforts.

City of Westminster

An initial CCO meeting was held by the City of Westminster on April 25, 1983. This meeting, attended by representatives of the City of Westminster, CWCB, UDFCD and the study contractor, was held to discuss the nature and purpose of the study and the scope and limits of work.

The following agencies and individuals were contacted and supplied information used in the preparation of this study:

- City of Westminster Engineering Department
- Colorado Highway Department
- Natural Resources Conservation Service (NRCS) (formerly known as Soil Conservation Service)

On January 5, 1987, the results of the original FIS were reviewed at a final coordination meeting attended by representatives of the City of Westminster, UDFCD, FEMA, and the study contractor.

Jefferson County and Incorporated Areas

Documentation on the coordination meetings for the June 17, 2003, countywide DFIRM is limited. A final community coordination meeting is typically twelve months before the effective date, or approximately June 2002. The meeting would have included representatives from FEMA Region VIII, FEMA's National Service Provide contractor Michael Baker Jr., and all communities within Jefferson County.

On June 1, 2006, the Urban Drainage and Flood Control District (UDFCD) as the local Coordinating Technical Partner (CTP) hosted an initial CCO to discuss the countywide DFIRM project. The countywide project was funded in two parts. The first part was to convert the effective DFIRM horizontal and vertical datums. The second part was to reproduce the countywide DFIRM panels to reflect the new datums and updated studies and letters of map revision (LOMRs) published since the 2003 countywide DFIRM.

The final CCO meeting was held on August 1, 2011, to present and accept the results of the new countywide DFIRM to the communities within Jefferson County. Representatives from FEMA Region VIII, FEMA's Production and Technical Services contractor Michael Baker Jr., UDFCD, UDFCD's CTP contractor ICON Engineering, Inc., and all communities within Jefferson County were present at the meeting.

2.0 AREA STUDIED

2.1 Scope of Study

There are no areas wholly excluded from this study. All jurisdictions that have a majority of land area within Jefferson County are represented in this countywide study. Accordingly, the City of Westminster is not included in the Jefferson County study because the majority of Westminster's land area is within Adams County and has been included in the Adams County and Incorporated Areas DFIRM and FIS. There are no areas of extraterritorial jurisdiction applicable to the Jefferson County study.

The streams studied by detailed methods, in part or in whole, within Jefferson County are presented in Table 1, "Streams Studied by Detailed Methods." The streams studied by approximate methods, in part or in whole, are presented in Table 2, "Streams Studied by Approximate Methods." The scope and methods of this study were proposed to, and agreed upon, by FEMA and Jefferson County.

A detailed analysis for a portion of the South Platte River was adopted from the FIS for Douglas County (Reference 20).

Technical data for flooding on City Park Channel, Nissen Reservoir Channel, and overflow from Brandywine Creek were taken from a report by the Colorado UDFCD (Reference 21) and the FIS for the City of Broomfield, Colorado (Reference 22).

North of the detailed study area in the City of Edgewater, approximate methods of analysis were used to study another sub-basin adjacent to Sloans Lake. The resulting floodplain for this area was not as well defined because of the poorly defined channels in the areas of the street and overland flow upstream of Depew Street (Reference 24).

Table 1: Streams Studied by Detailed Methods

Airport Creek
Arapahoe Gulch
Barbara Gulch
Barbara Gulch Spill Flow
Apex Gulch
Bear Creek
Bear Creek – Kittredge to Evergreen
Bear Creek – Lakewood
Bear Creek Tributary 1
Bear Creek Tributary 2
Bear Creek Tributary No. 3
Bear Creek Tributary 5
Bear Creek Tributary 6
Bear Creek Tributary 7
Bergen Creek
Big Dry Creek
Buffalo Creek
City Park Channel
Clear Creek
Clear Creek – Overflows
Cold Spring Gulch
Coon Creek
Coon Creek – North Branch
Countryside Creek
Cressmans Gulch
Cub Creek
Cub Creek (200 scale)
Deadman Gulch
Deer Creek
Dry Gulch
Dutch Creek
Dutch Creek Trib
Elk Creek
Jackson Gulch
Kenneys Run
Kenneys Run East Fork Tributary 1
Kerr Gulch
Lakewood Gulch
Lena Gulch
Lena Gulch Tributary
Lena Gulch – Upstream and Overflows
Leyden Creek
Leyden Creek – Upstream
Lilley Gulch
North Branch Lilley Gulch
Little Cub Creek
Little Dry Creek
Little Dry Creek – Tributary B
Massey Draw
Massey Draw Tributary
Massey Draw – Split Flows
McIntyre Gulch
Middle Branch Hylands Creek
Middle Cotton Creek
Mount Vernon Creek
Myers Gulch
Nissen Reservoir Channel
North Branch Hylands Creek
North Branch Walnut Creek
North City Park Creek
North Cotton Creek
North Fork South Platte River
North Fork of West Fork of Kenneys Run Tributary No. 1
North Sanderson Gulch
North Turkey Creek
Parmalee Gulch
Pine Gulch
Quail Creek
Quail Creek Split Flow
Ralston Creek
Ranch Creek
Rooney Gulch
Rooney Gulch – Spillway
Sand Draw
Sawmill Gulch
SJCD 6100
SJCD 6200
SJCD 6200 - North Tributary
SJCD 6200 – Tributary 1
South Branch Hylands Creek
South Branch Ranch Creek
South Cotton Creek
South Platte River
Swede Gulch
Switzers Gulch
Tanglewood Creek
Troublesome Creek
Tucker Gulch
Turkey Creek
Upper Sloans Lake Basin Drainageway
Van Bibber Creek (400 scale)
Van Bibber Creek Tributary
Van Bibber Creek Left Overbank Splitflow
Walnut Creek
Weaver Creek
Weir Gulch Tributary
West Fork Kenneys Run
West Fork Kenneys Run Tributary 1
West Fork Kenneys Run Tributary 2
Wilmot Creek
Wilmot Creek Tributary

Table 2: Streams Studied by Approximate Methods

Apex Gulch
Bates Lake Area
Bear Creek
Beaver Brook
Beaver Creek
Big Dry Creek
Blue Creek
Brush Creek
Buffalo Creek
Casto Creek
Clear Creek
Coal Creek
Dutch Creek
Elk Creek
Giant Gulch
Guy Gulch
Jackson Gulch Tributary
Kennedy Gulch
Ketner Creek
Lans Gulch
Last Resort Creek
Leyden Creek
Little Dry Creek
Little Dry Creek Tributary B
Little Dry Creek Tributary C
Massey Draw
Mount Vernon Canyon
Myers Gulch
North Fork Deer Creek
North Fork South Platte River
North Turkey Creek
Pine Gulch
Ralston Creek
Shaw Heights Tributary
Sloans Lake Area
Soda Creek
South Fork Deer Creek
South Platte River
South Turkey Creek
Tucker Gulch
Van Bibber Creek
Walnut Creek
West Resort Creek
Woman Creek

Ketner Creek (Reference 23), Shaw Heights Tributary, and Little Dry Creek (Reference 24), which were studied previously by the UDFCD, were included as approximate study areas within the City of Westminster.

The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development or proposed construction.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA and the communities.

2.2 Community Description

Jefferson County is located in north-central Colorado. It covers an area of 789 square miles with mountains along the west and "semiarid" plains in the east adjacent to the City and County of Denver (Reference 25). In addition, Jefferson County is bounded by the City of Littleton and Arapahoe, Adams, and Douglas Counties to the east; Teller County to the south; Park County to the south and southwest; Clear Creek and Gilpin Counties to the west; and Boulder County to the north.

The population of Jefferson County was 534,543 in 2010 (Reference 26). Most people reside in the eastern part of the county.

Jefferson County was named in honor of Thomas Jefferson. The county was created in 1861 and was one of the 17 original counties of the Colorado Territory. The early history of Jefferson County centers on two groups of people: fur trappers and gold prospectors exploring the sands of Clear Greek for placer gold in 1858. According to the Colorado State Historical Society, a pioneer mining camp known as Arapahoe City was located a few miles east of the present site of the City of Golden in November 1858. Reportedly, George A. Jackson and John H. Gregory went on from there to make their historic gold discoveries near Idaho Springs and Central City.

The development of Jefferson County began with the discovery of gold and the resulting gold mining. Other types of mining have gradually become more important than gold mining, with uranium currently one of the leading mining products. Agriculture also assumed a prominent role in the development of Jefferson County and, until the end of World War II, the county depended primarily upon a mining and agricultural economy.

Industry, which has developed since World War II, has produced a more diversified economy. Federal and local government activities also play a major role in the economy of the county.

Jefferson County is situated in an area of the complex Southern Rocky Mountain Province known as the Front Range. The Front Range and its accompanying hogback foothills, occupying most of the western and southern portions of the county, cross the county in a northwest-southeast direction. The remaining northeastern part of the county is composed of rolling hills, which taper off to what might be called the far western edge of the Great Plain area to the east. Elevations within the county vary from approximately 5,000 feet in the northeast to over 10,000 feet in the southwest.

Jefferson County lies within the South Platte River drainage basin. The major streams originate in the mountains in the west and flow generally to the east toward the South Platte River, which forms the southeast border of the county.

East of the foothills, the climate is continental. The general features are low relative humidity; an extensive amount of sunshine; light rainfall, confined largely to the warmer half of the year; moderately high wind movement; a large daily range in temperature; high day temperature in summer; and generally, in the winter, a few protracted cold spells.

The climate is characterized by cold winters and warm summers. Mean monthly temperatures range from approximately 30 degrees Fahrenheit (°F) in January to approximately 75°F in July, with an average annual temperature of approximately 50°F. Recorded temperature extremes are a high of 102°F to a low of —26°F. The average annual precipitation is 14.95 inches, falling mainly from April to August (Reference 27). The heaviest recorded general rainfalls have come in late May and early June, when the temperature contrast between warm surface air and cool upper air is greatest. The Front Range foothills of the Rocky Mountains area are also subject to a meteorological phenomenon known as cloudbursts. They are confined chiefly to the eastern foothills regions below an elevation of 7,500 feet and extend eastward toward the plains for approximately 50 miles. Cloudbursts develop when there is a marked temperature range within a relatively small area and occur in the afternoon or early evening of an unusually warm day. Cloudbursts are characterized by intense rainfall of short duration that is confined to a very small area. These storms have rarely occurred where precipitation could be measured at a weather station (Reference 28). In the area, the peak discharge from a cloudburst is greater than that caused by rainfall during a period of snowmelt.

The City of Golden, which is the county seat, was founded in 1859 and was first called Golden City. Golden was the capital of the Jefferson Territory from 1862 to 1867.

Golden is located in northern Jefferson County, approximately 8 miles west of Denver and 18 miles south of Boulder. The city lies at the base of the Front Range foothills of the Rocky Mountains. Golden encompasses an area of 7.1 square miles and had an population of 18,867 in 2010 (Reference 26).

The stream network in Golden is composed of Clear Creek, which flows from west to east, and its tributaries. Tucker Gulch is a left-bank tributary, providing drainage for areas north of Clear Creek. Kenneys Run and Lena Gulch are right-bank tributaries, providing drainage from areas south of Clear Creek. The confluences of Tucker Gulch and Kenneys Run with Clear Creek occur within the City of Golden. The confluence of Lena Gulch with Clear Creek occurs downstream of the city.

Clear Creek has its source in the Rocky Mountains at the Continental Divide. After flowing easterly through the mountains, Clear Creek enters the high plains at Golden and flows northeasterly to Commerce City, where it joins the South Platte River. The 400-square-mile drainage area of Clear Creek above Golden is characterized by steep slopes, rugged terrain, and forests. Within Golden, the Clear Creek floodplain contains heavily developed areas as well as parks and campgrounds.

Tucker Gulch begins in the foothills northwest of Golden and winds its way through Golden Gate Canyon before flowing into Clear Creek in Golden. Tucker Gulch drains an area of 11.22 square miles above Clear Creek. Cressmans Gulch is a left-bank tributary to Tucker Gulch, whose 1.48-square-mile drainage area covers the foothills and valley area west of North Table Mountain. The drainage areas in the upper portions of these stream basins have steep slopes and cover complexes that vary from forested areas to rangeland with rock outcroppings.

West Fork Kenneys Run and its tributaries drain a 3.43-square-mile basin that starts on the eastern face of Lookout Mountain and extends across the plains southwest of Golden. East Fork Kenneys Run drains a 1.78-square-mile basin that starts on the western face of South Table Mountain and extends across the plains southeast of Golden. The upper portions of both these basins have steep slopes and rugged terrain. The plains portion of the West Fork Kenneys Run basin is primarily hilly rangeland, with heavy urban development beginning north of 24th Street. The plains portion of the East Fork Kenneys Run basin has the same hilly topography as the West Fork Kenneys Run basin; but, overall, it has been more heavily developed. The forks join at 20th Street to form Kenneys Run, which flows northeasterly through a buried 8-foot diameter corrugated metal pipe culvert to its confluence with Clear Creek. The intervening 1-square-mile basin between the confluence of East and West Forks Kenneys Run and the mouth of Kenneys Run is a heavily urbanized area lying in the valley between Lookout and South Table Mountains. The floodplain areas for the entire length of Kenneys Run and the low portions of East and West Forks Kenneys Run have been densely developed.

Lena Gulch has its source on Lookout Mountain and flows northeasterly, where it joins Clear Creek in Wheat Ridge. Apex and Jackson Gulches drain the foothill area south of Lookout Mountain before joining below Heritage Square at the base of the foothills to form Lena Gulch. Lena Gulch then flows parallel to the north side of U.S. Highway 40 through the City of Golden. This reach also receives runoff from the northwestern slope of Green Mountain. The total drainage area of Lena Gulch affecting Golden is 3.68 square miles and is characterized by steep slopes, bedrock outcrops, some forested areas in the foothills, and by heavily developed floodplain areas in Golden. At several locations along Lena Gulch, the natural channel has been diverted and partially filled.

The City of Arvada is located on the east slope of the Rocky Mountains, about 6 miles northwest of the State Capitol building in Denver. The population of Arvada in 2010 was 106,433 (Reference 26).

The majority of the streams that were studied within Arvada flow through somewhat dense residential and commercial areas. All of the study streams have their source of flow in the Rocky Flats area and eastern foothills of the Rocky Mountains. Ralston Creek is tributary to both the Ralston and Arvada Reservoirs and Leyden Creek is tributary to the Leyden Reservoir. Little Dry Creek flows through, or is adjacent to, both Lake Arbor and the Pomona Lakes, which are recreational facilities owned and maintained by the City of Arvada. The total basin area draining the study streams is approximately 104 square miles. The elevations within the drainage basins for the streams range from over 10,000 feet in the upper portion of the Ralston Creek basin to 5,250 feet at the confluence of Ralston Creek and Clear Creek. For the most part, the study streams have a relatively small base flow for most of the year.

The City of Edgewater is located on gently rolling land in eastern Jefferson County and is bordered by the City of Wheat Ridge to the north, the City of Lakewood to the west and south, and the City and County of Denver to the east. Edgewater is immediately west of Sloans Lake, a park in the City of Denver.

The City of Edgewater is fully developed with the exception of a few areas of vacant land. The population in 2010 was 5,170 (Reference 26).

Elevations in Edgewater range from approximately 5,200 feet to approximately 5,500 feet.

The City of Lakewood is located in Jefferson County, sprawling between Denver and the foothills of the Rocky Mountains. On August 28, 1969, Lakewood was transformed from the most populated unincorporated area in the United States to Colorado's fourth largest city. The population in 2010 was 142,980 (Reference 26).

Lakewood lies in the drainage of Lena Gulch, Dry Gulch, Lakewood Gulch, South Lakewood Gulch, McIntyre Gulch, Weir Gulch, Sanderson Gulch, North Sanderson Gulch, Bear Creek, and several unnamed streams. These streams all flow in a westerly to easterly direction and are left-bank tributaries of the South Platte River.

The Town of Morrison is located at the base of the foothills of the Front Range of the Rocky Mountains. It is approximately 12 miles southwest of the State Capitol building and lies in the center of Jefferson County. The population in 2010 was 428 (Reference 26). The town has an area of approximately 0.25 square mile.

Morrison is situated at the point where Bear Creek Canyon opens onto the plains. Bear Creek, which drains an eastern slope of the Front Range, emerges from the foothills and flows through the center of town. Mount Vernon Creek, a much smaller stream and a left-bank tributary to Bear Creek, has its junction with Bear Creek in the center of town.

Bear Creek is subject to cloudburst-type floods, and it is possible that a peak from both Bear Creek and Mount Vernon Creek could reach Morrison at approximately the same time, causing very high flood levels in the town, perhaps as high as 10 to 15 feet. From the foothills near Morrison, Bear Creek flows through a valley for a distance of 10 miles to its junction with the South Platte River. It drains an area of approximately 165 square miles above the Morrison gage, which is near the State Highway 8 bridge over Bear Creek.

Mount Vernon Creek drains an area of approximately 10 square miles beginning near Genesee Park along Interstate Highway 70 at its upper end and empties into Bear Creek at Morrison. Another left-bank tributary to Bear Creek, called Bear Creek Tributary No. 1, drains an area of 0.65 square mile and also has its junction with Bear Creek near the center of town.

The City of Westminster is located on the east slope of the Rocky Mountains, about 8 miles northwest of the State Capitol building in Denver. In 2010, the population of Westminster was 106,114 (Reference 26).

Big Dry Creek has its source in the Rocky Flats area southwest of the City of Boulder, and is a tributary to Standley Lake. Walnut Creek begins near the Rocky Flats Plant of the Atomic Energy Commission, and is a tributary to the Great Western Reservoir. Little Dry Creek originates just southwest of Standley Lake, passing through Arvada and Westminster to Clear Creek. Airport Creek has its source in the Jeffco Airport area.

All of the other streams studied have their sources basically within the city limits, and have little or no flow most of the time.

The total drainage area of Big Dry Creek to Interstate 25 (125) is 56.84 square miles, of which 16.75 square miles are above the two reservoirs. Watershed elevations range from approximately 6,500 feet at the headwaters of the drainage area of Standley Lake to 5,160 feet at 125.

The City of Wheat Ridge is located in Jefferson County, bounded by Denver to the east and the frontal range of the Rocky Mountains on the west. On August 20, 1969, Wheat Ridge was converted from a large unincorporated area into a municipality. The population in 2010 was 30,166 (Reference 26). Wheat Ridge lies in the drainage of Clear Creek of which Lena Gulch is a right-bank tributary. Clear Creek is a left-bank tributary of the South Platte River. Originating along the Continental Divide, Clear Creek flows eastward to its confluence with the South Platte River near Welby.

2.3 Principal Flood Problems

Past flooding along most of the streams in the county is not well documented. On any of the small, ungaged streams there are no available data regarding flood magnitude or damage. There are some records available for the larger streams in and near Jefferson County, and it is reasonable to assume that floods occurred simultaneously on the smaller streams as well (References 29 through 32). Records that are available include:

Bear Creek — Flooding occurred along the creek in 1876, 1894, 1896, 1957, 1965, and 1969. The 1896 flood was the largest. Twenty-seven lives were lost, and severe property damage was reported from Evergreen to the mouth. The discharge at the Morrison gaging station was 8,600 cubic feet per second (cfs) (Reference 33).

Clear Creek — Past floods on Clear Creek have been infrequent and more severe in the upper reaches (Reference 34). Major flooding occurred in Golden in 1888 (8,700 cfs), and 1956 (5,250 cfs), and in Derby in 1965 (5,070 cfs).

South Platte River — Large floods were reported in 1844, 1864, 1867, 1876, 1894, 1921, 1933, 1942, 1965, and 1973. The largest and most damaging of these occurred June 16 and 17, 1965, when a discharge of 40,300 cfs was computed at USGS stream gage No. 06714000, near the 19th Street Bridge in Denver. Flooding occurred throughout the South Platte River basin resulting in six drowning, two other deaths caused by flood-related activities, and damage estimated at $500 million, of which $300 million occurred in the Denver area (References 29 through 32).

Because of conscious efforts by Jefferson County, commercial and residential floodplain development has been severely restricted. However, some older developments,

particularly in the mountain valleys and foothill areas, have a high potential for flooding problems.

In general, within the city of Arvada, the streams are well defined with relatively narrow channels. Potential flooding problems along the streams can be attributed to the large developed areas that have encroached into the overbanks of these channels, severely constricting the floodplain and diminishing the carrying capacity for large floodflows.

In the City of Edgewater, flood problems within the Sloans Lake subbasin occur as a result of overflow from the drainageway between Ingalls Street and 20th Avenue to the eastern corporate limits at Depew Street. Upstream of Ingalls Street and 20th Avenue to the western corporate limits, overflow is split between a storm sewer and the streets. Flooding in this area is caused in part by thunderstorms during the spring, perpetuated by antecedent ground mixture and melting snow.

In the City of Golden, manmade and natural obstructions in stream channels and floodplain areas impede the flow of water, creating a backwater effect that increases flood heights. These obstructions include bridges, culverts, stream-regulating structures, channel realignments from their natural course, buildings in the floodplains, and trees and brush in the stream channels.

The history of flooding in the City of Golden indicates that the most serious flooding has been the result of cloudbursts occurring from late May to early September. Several severe floods have been recorded in Golden since 1864. On August 1, 1888, cloudbursts along the Front Range produced a peak discharge on Clear Creek of 8,700 cfs that lasted for two hours. This discharge was measured 7 miles upstream of Golden. Most of the damage from this flood occurred in Clear Creek Canyon between Idaho Springs and Golden (Reference 28). On July 24, 1896, cloudbursts over Clear Creek Canyon and Golden Gate Canyon produced floods on both Clear Creek and Tucker Gulch. Three people were killed when a wall of water passed down Tucker Gulch. Most of the homes and businesses along lower Tucker Gulch sustained substantial damage (many were completely demolished) and most of the bridges across Clear Creek were swept away (Reference 35). On July 23 and 24, 1965, heavy rains over the Clear Creek and Tucker Gulch basins (4.5 inches in one hour being reported on Tucker Gulch) produced flash flooding in Golden and inundated a wide area, causing major damage to homes, bridges, and utility lines. The most extensive damage occurred along Tucker Gulch (Reference 34). The preceding descriptions are examples of some of the more amazing floods experienced in Golden; however, many other floods have also inflicted damage.

Within the Town of Morrison, the history of flooding indicates that floods occur from late May through early September, seemingly the result of cloudburst activity. Flood problems in the town result from high peaks occurring in Bear Creek and Mount Vernon Creek as they enter Morrison, especially when they occur simultaneously or in close succession. Much property has been destroyed, including bridges, railroad tracks, houses, and highways in the canyons (Reference 28).

Both manmade and naturally occurring obstructions exist within the floodplain, restricting the flow of water and causing an increase in flood levels. The obstructions consist of trees and a heavy growth of underbrush in some areas. Obstructions within the

Bear Creek floodplain consist mostly of large rocks, trees, and some brush areas within the floodplain.

Many smaller tributaries to Bear Creek upstream from Morrison contribute relatively large peak flows to the Bear Creek floodplain and thus to Morrison.

The highest recorded floods for Morrison occurred on July 24, 1896; July 7, 1933; and September 2 and 3, 1938. The peak flows estimated for the 1896 and 1933 floods above Mount Vernon Creek are 8,600 cfs and 8,110 cfs, respectively. The 1938 flood was caused by a cloudburst that centered on the divide between Mount Vernon and Bear Creeks near the top of Genesee Mountain. The highest peak for Bear Creek at Morrison, above Mount Vernon Creek, was only 6,200 cfs; however, the peak for Mount Vernon Creek at Morrison was 9,230 cfs (Reference 28). Other floods of lesser magnitude occurred on Bear Creek in 1934, 1957, 1965, and 1969 (Reference 36).

In the City of Westminster, the streams that flow into Standley Lake and Great Western Reservoir, along with Big Dry and Little Dry Creeks, are generally well defined with relatively narrow channels. The tributaries to Big Dry and Little Dry Creeks are not very well defined and at times, are generally shallow with low banks. Industrial and residential developments exist along portions of the streams, especially below the reservoirs.

Generally, the streams are intermittent, having little or no flow most of the time. Flooding in the Westminster area is caused by heavy local rainstorms. Flooding occurred in May 1973, especially in the vicinity of Big Dry Creek at Huron Street.

2.4 Flood Protection Measures

There are numerous dams, reservoirs, and channel improvements within Jefferson County. Many of these flood protection measures affect flood peaks on the streams included in this study. In addition to an active floodplain management program, the major flood protection measures are listed below:

Bear Creek – Evergreen Lake, located just upstream of Evergreen, is primarily used for water supply and recreation and provides little routing effect to the flood peak. Mt. Carbon Dam and the Bear Creek Lake were designed by the USACE for the purpose of flood control. Peak flows from the 1-percent-annual-chance event have been reduced from 30,000 cfs to approximately 1,000 cfs through storage in the reservoir. However, because of its location, there is little protection provided for other areas in Jefferson County.

Bear Creek Tributaries No. 1 and No. 3 – Storm sewers have been constructed at various places along these streams. During a flood event, these storm sewers will overtop, and damage caused by the resultant flooding may be greater than before the storm sewers were installed.

Bergen Creek – Channel improvements have been constructed immediately downstream from State Highway 74. These improvements provide significant protection to the adjacent buildings, but are overtopped during extreme flood events.

Buffalo Creek – Wellington Lake is located near the headwaters of Buffalo Creek. This lake is used for water supply and recreation and provides negligible flood protection.

Clear Creek – There are few flood protection measures for Clear Creek that cover areas in Jefferson County. Some channelization work has been done in and near Golden, but this has little effect during a flood peak. Additional channel improvements have been constructed between Marshall Street and Wadsworth Boulevard.

Coon Creek – There are three on-stream reservoirs on Coon Creek that help to reduce the flood peaks in their immediate vicinity. These are Grant A Lake, Beer Sisters Lake, and an unnamed reservoir at the upstream study limit

Lena Gulch – Channelization has been completed through the Denver West Office Park. The improvements are sufficient to provide protection for the office buildings in this area.

Lena Gulch Tributary – Channel improvements have been constructed from approximately the mouth upstream to Pike Street. Good flood protection is provided to residences in this area.

Leyden Creek – Leyden Lake, located just upstream of Indiana Street, provides some storage routing during flood events. The 1-percent-annual-chance peak discharge is reduced from 3,382 cfs to 2,200 cfs downstream of the lake.

Lilley Gulch – There is one small reservoir just downstream of South Kipling Street and several places where ponding could occur behind road embankments. However, these areas do not provide enough storage to significantly affect the peak discharges.

North Branch Coon Creek – An unnamed reservoir located just upstream of South Simms Street provides little flood peak reduction.

Ralston Creek – Ralston Reservoir, located west of State Highway 93, provides some storage routing during flood events. Blunn Reservoir is inoperative, but may provide additional flood protection in the future.

SJCD 6100 – Webster Pond, located just upstream from Webster Street, provides some flood storage area, but has a minor effect on the peak discharges. Channel improvements have been constructed between Lamar Street and Pierce Street, which provide good flood protection in this area.

SJCD 6200 North Tributary – Channel improvements have been constructed between Ken Caryl Avenue and South Kendall Boulevard, and a storm sewer has been installed between Ken Caryl Avenue and Platte Canyon Road. These facilities provide a moderate degree of flood protection in this area.

Troublesome Creek – There are several small on-stream ponds that have a negligible effect on peak discharges.

Van Bibber Creek – Channel improvements have been constructed along the north side of West 58th Avenue.

Van Bibber Tributary – Ramstetter Reservoir, which is located at the upstream end of the area studied, near State Highway 93, provides minimal routing effect to the peak discharges.

In the City of Arvada, flood protection measures on the study streams consist primarily of channelization projects and improvements to a number of important bridges. Future protection measures on the streams were designed, as outlined in the UDFCD plans entitled "Major Drainageway Planning Study for Lower Ralston/Van Bibber and Leyden Creeks" (Reference 37). These future measures consist of additional channelization and the use of detention ponds.

In Arvada, a number of reservoirs exist on the study streams which provide incidental flood protection, even though they were not specifically designed as flood control structures. Arvada Reservoir, which is owned and maintained by the City of Arvada, and Ralston Reservoir, which is owned and maintained by the Denver Water Board, are located on Ralston Creek. Lake Arbor, which is located on Tributary C of Little Dry Creek, and the Pomona Lakes, which are located on Little Dry Creek, are designated as recreation facilities that are owned and operated by the City of Arvada. Leyden Lake, located on Leyden Creek, is currently a water storage facility owned and operated by the Farmers High Line Canal Company. The above-mentioned reservoirs, with the exception of Leyden Lake and Arvada Reservoir, are expected to attenuate the 1-percent-annual-chance event. In addition, the City of Arvada has provided assurances to FEMA that these reservoirs, with the exception of Leyden Lake, would continue to be maintained and operated.

The City of Edgewater, in conjunction with the City of Lakewood and City and County of Denver, permitted the UDFCD to plan and implement channel and culvert improvements in 1977. The UDFCD constructed the West 18th Avenue extension channel from Depew Street to Sheridan Boulevard. To improve the efficiency of bridge culverts at Depew Street and Sheridan Boulevard, the UDFCD installed twin 12- by 5-feet culverts at Depew Street and four 7- by 5-feet precast-concrete boxes at Sheridan Boulevard. All construction was completed by early 1983. The installed culverts relieve bottleneck conditions caused by inundation. In 1987, channel improvements between Ingalls Street and 20th Avenue to Depew Street were completed. A detention pond outside the corporate limits at 25th Avenue and Wadsworth Street reduces sheetflow east of Pierce Street.

No flood protection measures are provided upstream of Golden on any of the streams. Within the city, channelization measures have been taken in some areas; primarily, these measures are concrete walls to streamline the flow. Tucker Gulch has been sufficiently channelized from State Highway 58 to its confluence with Clear Creek to pass the 1-percent-annual-chance flood. The existing channelization of sections of Clear Creek is not sufficient to protect the city from 1-percent-annual-chance floods and floods of higher recurrence intervals. Clear Creek is channelized from Washington Avenue downstream.

The city has enacted an ordinance to minimize property damage and danger to life in floodplain areas (Reference 38). Provisions in the ordinance regulate and restrict the following: land use and development patterns; construction practices and flood proofing measures; presence of potentially hazardous debris and pollutants; design and

construction of water-supply systems, waste-water systems, and other public works; and design and construction of drainage systems subjecting other property to floodwater damage.

No flood protection measures have been provided immediately upstream of the Town of Morrison. Streams within Morrison have been channelized. Brick walls serving to streamline the flow comprise most of the channelization measures. However, most of the beneficial effects of the walls are nullified due to the adjacent growth of vegetation. These walls were built many years ago and have had little maintenance since that time.

Removal of vegetation, sediment deposits, debris, and rocks from the floodways of Bear Creek, Mount Vernon Creek, and Bear Creek Tributary No. 7 would improve flood control, but the problem of the inadequate capacity of the State Highway 8 box culvert would remain.

There are no flood protection works in the City of Westminster on the streams in the areas that were studied. However, two large reservoirs, Standley Lake and Great Western Reservoir, exist at the upstream limits of the study area and provide incidental protection even though they were not designed for flood control storage.

In addition, Ketner and Jackson Lake reservoirs exist within the study area but are primarily used for irrigation purposes and therefore, were not considered as flood protection structures. Westminster has passed zoning ordinances to prohibit construction within floodplains to lessen potential flood damage. The Ketner Reservoir has been renovated to increase its flood storage capacity, thus reducing the downstream flows and floodplains.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood-hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the county.

For Big Dry Creek, synthetically developed hydrographs were computed to determine potential flood magnitudes. The area was divided into 517 sub-basins, which ranged from 0.01 to 1 square miles. Hydrographs for each of the sub-basins were developed with the U.S. Environmental Protection Agency Storm Water Management Model (SWMM; Reference 45). The SWMM models were first developed for each of the tributary watersheds, and the main stem model was developed by linking the tributary outfalls together and routing the discharge hydrographs downstream in Big Dry Creek.

Jefferson County (Unincorporated Areas)

Detailed discussions of the hydrologic analyses for the streams studied were presented in previous hydrology reports. The hydrologic analyses for Cold Spring, Kerr, Swede, and Switzer Gulches, and the SJCD 6200 North Tributary were discussed in a 1982 hydrology report (Reference 39). The remainder of the streams was discussed in a four-part technical addendum prepared in 1979 (Reference 40).

Discharges for streams with drainage areas greater than 15 square miles were calculated using a log-Pearson Type III frequency analysis (Reference 41). As is typical in Colorado, flood events in the study area comprise two distinct and generally independent populations (i.e., rain and snowmelt floods).

For this reason, it was necessary to analyze the rain and snowmelt events separately. Each type of flood event was assumed to follow log-Pearson Type III distribution. At each of 15 USGS gaging stations with at least 15 years of record, two annual peak flood series were determined, respectively, for the rain events and snowmelt events from streamflow charts. Three statistical parameters, the mean, standard deviation, and skew, which define the log-Pearson Type III distribution, were then computed for each type of flood event. The statistical parameters are intuitively dependent on watershed characteristics and hydrometeorologic conditions in the region. Two basin parameters, drainage area and mean watershed elevation, which most significantly affect the magnitudes of floods, are regarded as independent variables in the discharge predictive regression analyses. The regression equations, including only the significant independent variables for each type of event, were used to compute the flood-frequency curve at any ungaged site, given the drainage area and mean watershed elevation. These two frequency curves, one for rain events and the other for snowmelt events, were then statistically combined to give a composite flood-frequency curve that defines the flood-frequency curve for the ungaged site in question.

Discharges for streams with less than 15 square miles of drainage area were calculated using the Colorado Urban Hydrographic Procedure (CUHP) (Reference 42). The 10-, 2-, and 1-percent-annual-chance discharges were calculated directly, whereas the 0.2-percent-annual-chance discharge was estimated by extrapolation. Peak discharges at selected locations in the study area were obtained by routing CUHP flood hydrographs for each subbasin.

Peak discharges for the South Platte River were developed as part of the FIS for Douglas County (Reference 20). In that study, a log-Pearson Type III analysis (Reference 41) was used to calculate the discharges. Streamflow data from USGS stream-gaging stations

located at South Platte (Gage No. 06707500) and below Cheesman Lake (Gage No. 06701500) were used in the frequency analysis.

The hydrologic analyses for Lena Gulch upstream of West 6th Avenue, Jackson Gulch, Kenneys Run, and Clear Creek, upstream of the Burlington Northern Railroad were developed as part of the FIS for the City of Golden (Reference 5). In that study, the peak discharges for Clear Creek above the Burlington Northern Railroad were obtained from the USACE, Omaha District (Reference 43). The USACE established peak discharge frequency relationships for floods of 10-, 2-, 1-, and 1-percent-annual-chance events. A log-Pearson Type III analysis (Reference 41) was conducted on the discharge records for the Clear Creek USGS stream gages at Golden (1911-76) and Derby (1934-76); however, the statistical parameters computed by these methods were not sufficiently reliable to predict the frequency of extreme events. In lieu of a discharge-frequency analysis, a rainfall-runoff approach was used. The Massachusetts Institute of Technology Catchment Model (Reference 44) was constructed for the 400-square-mile area above the Golden gage, and a storm water management model (Reference 45) was constructed for the 175-square-mile area between the Golden and Derby gages. The rainfall depths used in the analysis were based on data obtained from the 1973 National Oceanic and Atmospheric Administration (NOAA) report, "Precipitation-Frequency Atlas of the Western United States, Volume III, Colorado" (Reference 46). The runoff models were calibrated against the discharge records available at the respective stream gages.

The 10-, 2-, and 1-percent-annual-chance peak discharges for Kenneys Run were calculated using the CUHP (Reference 42). The design rainfall data were supplied by the UDFCD based on values obtained from NOAA (Reference 46). Peak discharges at selected locations in the study reaches were obtained by routing the flood hydrographs for each subbasin computed by the CUHP.

The peak discharges for Lena Gulch, upstream of West 6th Avenue, and Jackson Gulch were obtained from a 1975 study done for the UDFCD by Wright-McLaughlin Engineers (Reference 47). In this study, the CUHP was used to calculate the 10-, 4-, and 1-percent-annual-chance discharges for present and future development conditions. The design rainfall used in the study was supplied by the UDFCD, based on information from the NOAA (Reference 46). During the study, the drainage area of Lena Gulch was field checked to determine that current development conditions would be properly reflected by the estimated future development conditions reported in the 1975 UDFCD study. The future development conditions for flood discharge values from the 1975 study (Reference 47) were determined to be valid for this FIS. The 2- and 0.2-percent-annual-chance discharges were estimated from the frequency curves based on the 10-, 4-, and 1-percent-annual-chance discharge values.

A revised detailed study was prepared for Bear Creek and North Turkey Creek (Reference 8) as follows:

1. Approximately 8.4 miles of Bear Creek, including the reach at Idledale, the reach from Kittredge to Evergreen, and the reach upstream of Evergreen Lake. These detailed study reaches are separated by reaches of approximate study and are therefore noncontinuous.

2. Approximately 6.9 miles of North Turkey Creek, from Danks Drive to the upstream limit of detailed study.

The report by Messrs. Thomas and Miller (Reference 48) recommends mathematical relations for estimating the magnitude and frequency of floodflows on streams draining more than 15 square miles in Jefferson County, Colorado. A least square, linear multiple regression analysis defined the recommended relations from data on the floodflow. Physical and climatic characteristics were observed at 27 sample sites in the South Platte River basin in Colorado.

Basic data for the 27 sites were taken from USGS reports. The regression analysis utilized "composite curve" values which were determined by statistically combining individual flood frequency curves of snowmelt and rainfall floods. The regression equations utilize three independent basin parameters: total drainage area, normal annual precipitation, and mean drainage basin elevation. The equations developed in this study may be used to estimate flood peak magnitude and frequency at ungaged sites in Jefferson County with consideration given to their capabilities and limitations. For North Turkey Creek, the equations presented in the Miller and Thomas report were used to develop revised discharges for the 10-, 2-, 1- and 0.2-percent-annual-chance floods (Reference 48).

For Bear Creek, revised peak flows were developed from a flood frequency analysis at the stream gage in Morrison as presented in a report, entitled "Flood Hydrology of Foothill and Mountain Streams in Colorado" by R. D. Jarrett. Revised peak flows for the ungaged portions of Bear Creek were determined by utilizing the following equation with peak flows at the Morrison gage:

$$Q_S = Q_G \, (A_S/A_G)^n$$

where

Q_S = Peak flow in cfs at the ungaged site
Q_G = Peak flow in cfs at the Morrison gage
A_S = Total drainage area at the ungaged site
A_G = Total drainage area at the Morrison gage
n = exponent

The exponent n was derived from the discharge-drainage relationship obtained by utilizing the Thomas and Miller regression equations and specific basin information at the sites on Bear Creek from Morrison to the Jefferson county line. The detailed study reach at Morrison was not revised because changes in peak flow values between those originally completed for the FIS and changes computed by Jarrett would not produce significant changes in elevations.

The peak discharge-frequency relationships utilized within this study for Ralston, Van Bibber, and Leyden Creeks within the City of Arvada, were obtained from the previously mentioned Major Drainageway Planning Report (Reference 37). The peak flows associated with Little Dry Creek and its tributaries can be obtained from the report entitled "Flood Hazard Area Delineation, Little Dry Creek," (Reference 49).

The flows presented in the Major Drainageway Planning Report (Reference 37) were generated using the Massachusetts Institute of Technology Catchment Program

(Reference 44). The flows reported within the study represented 2-, 5-, 10-, and 100-year return frequencies. Assurances could not be made by the City of Arvada that Leyden Lake would continue to be maintained and operated. Arvada Reservoir is a drinking water storage facility with its water level maintained at maximum elevation, thereby negating any flood routing ability. The peak flows used in the floodplain analysis do not represent any routing and resultant flood attenuation through these two reservoirs. However, assurances were made for the other previously mentioned reservoirs, and therefore, the floodflows were routed through those reservoirs.

Since Ralston, Van Bibber, and Leyden Creeks were partial detailed studies based upon the Major Drainageway Planning Report, the flows used in the hydraulic analysis were in accordance with the flows used in that report. Furthermore, many of these flows are based upon ultimate basin conditions in accordance with reasonable projections of land use by Jefferson County and the City of Arvada. The use of future floodflows is standard procedure for the UDFCD.

On Van Bibber Creek, the flows were based on basin development conditions as of 1984. It should be noted that a relatively minor difference exists between future and existing flows on this creek. This is because of the fact that much of the basin is already developed. On Leyden Creek, the flows were based upon future basin development conditions without Leyden Lake in place.

Since the flows for the 2- and 0.2-percent-annual-chance events were not reported in the Major Drainageway Planning Report, it was necessary to interpolate and extrapolate these flows from the known flows at various design points. The extrapolation and interpolation of these events were performed using a log-normal probability relationship.

The City of Edgewater is immediately west of Sloans Lake. The area between Sheridan Boulevard and Depew Street has a major drainageway resulting from a 2.07-square-mile tributary drainage basin flowing 3.4 miles easterly through it. The total basin area, including the 2.07-square-mile area, is 5.48 square miles. There is a stormwater channel from Ingalls Street and 20th Avenue to Depew Street.

Peak discharges of 1,070 cfs for the 4-percent-annual-chance flood were originally used to check "as-built" design conditions for the drainageway between Depew Street and Sheridan Boulevard. This flow revealed similarities and differences between past and present conditions in the area (Reference 50). The regulatory 1-percent-annual-chance discharge was applied to establish floodplain delineations. Findings indicate the 1-percent-annual-chance flood is contained within the improved channel between Depew Street and Sheridan Boulevard, and hydrographs of various frequencies have been generalized at this point.

The flood discharge values used for Lena, Jackson, and Apex Gulches within the City of Golden were obtained from the 1975 study done for the UDFCD by Wright-McLaughlin Engineers (Reference 47). In this study, the CUHP was used to calculate the 10-, 4-, and 1-percent-annual-chance discharges for present and future development conditions. The design rainfall used in the study was supplied by the UDFCD based on information from the NOAA Report (Reference 46). During the study, the drainage area of Lena Gulch was field checked to determine that 1982 development conditions would be properly reflected

by the estimated future development conditions reported in the 1975 UDFCD study. The future development conditions for flood discharge values from the 1975 UDFCD study were determined to be valid for the study. The 2- and 0.2-percent-annual-chance discharges were estimated from the frequency curves based on the 10-, 4-, and 1-percent-annual-chance discharge values.

Peak discharges of the selected recurrence intervals within the Town of Morrison were calculated for Bear Creek using a log-Pearson Type III frequency analysis (Reference 41). Frequency analyses were calculated using streamflow data from US GS stream gaging station located at the western edge of Morrison (Gage No. 067105 with continuous records since 1922), and historical records for the flood of 1896.

As with other streams in Jefferson County, it was necessary to analyze rain and snowmelt events separately to define the flood-frequency curve at the above referenced gage site. The results of this stream gage analysis were used as the discharges for the reach of Bear Creek upstream of the confluence with Mount Vernon Creek.

The reach of Bear Creek downstream of the confluence with Mount Vernon Creek required adjustment of the gage records because of the intervening drainage area. For this reach and others along Bear Creek, regression equations, including only significant independent variables for the mean coefficient of variation (and hence the standard deviation), and skew for each type of event, were used to compute the flood-frequency curve at any ungaged site with given drainage area and mean watershed elevation.

For the regional regression analysis, 15 gaging stations located in the drainage basins of North Fork South Platte River, Bear Creek, Clear Creek, Upper St. Vrain Creek, and Upper Big Thompson River were selected. These stations were selected so that peak flows are not significantly affected by diversions and/or regulations and lengths of record are at least 15 years. Among the 15 stations, the drainage areas range from 14.4 to 575 square miles and the mean watershed elevations range from 8,800 to 11,140 feet. The average length of record is 43 years.

From the recorded streamflow charts, the annual peak flows of rain floods and snowmelt floods were determined for each gaging station. For each individual station, the mean, standard deviation (and hence the coefficient of variation), and skew were computed from the annual flood series for each type of flood event. Regressions of the means, coefficients of variation, and skews on drainage areas and mean watershed elevations were then carried out for the 15 stations in the region.

CUHP was used to estimate the 10-, 2-, and 1-percent-annual-chance flood discharges for the study reaches of Mount Vernon Creek and Bear Creek Tributary No. 7. The 0.2-percent-annual-chance flood discharges were estimated by linear extrapolation of the flood-frequency curves based on the 10-, 2-, and 1-percent-annual-chance discharges. A detailed description of the CUHP is given in Volume I of the "Urban Storm Drainage Criteria Manual" (Reference 42).

Peak discharges at selected locations in the study reaches were obtained by routing the flood hydrographs for each subbasin computed by the CUHP.

The USACE, Omaha District, completed a Flood Plain Information report on Bear Creek and Mount Vernon Creek for the Town of Morrison in 1971 (Reference 51). The 1-percent-annual-chance discharge of 27,000 cfs was estimated for Bear Creek at Morrison using a procedure called "expected probability". Because discharges determined using this procedure are not accepted by FEMA, no consideration was given to using this value in the study. Study of the Morrison gage data resulted in a discharge of 13,500 cfs and 90 percent confidence interval between 7,730 and 28,300 cfs for the 1-percent-annual-chance flood.

Because no stream gage data were available for the streams studied within the city of Westminster, a rainfall-runoff analysis was conducted on the watersheds to determine the flood discharges. This was accomplished by using the CUHP rainfall-runoff computer program to develop the storm hydrographs (Reference 42) and the USACE HEC-1 flood hydrograph package computer program for the stream and reservoir routings (Reference 52). For this analysis, basin characteristics that define the size, shape, and runoff characteristics of the watershed, as well as rainfall amounts based on the selected recurrence intervals (obtained from the NOAA Atlas of Precipitation (Reference 46)) were used to compute flood hydrographs for various design points in the basin. All stream and reservoir routings were accomplished using the Modified Puls Method.

Since there was a lack of 0.2-percent-annual-chance precipitation data, the 0.2-percent-annual-chance frequency storm runoff values at each design point were calculated. The logarithmic values of the 10-, 2-, and 1-percent-annual-chance peak discharges were fit to a regression line by method of least squares. The 0.2-percent-annual-chance discharges were analytically extrapolated from the regression line based upon a log-normal probability relationship. For more detailed information see the final hydrologic analysis report for Big Dry Creek and Tributaries prepared by Greiner Engineering Sciences, Inc., January 1984.

Peak discharge-drainage area relationships for streams studied by detailed methods are shown in Table 3, "Summary of Discharges."

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

The hydraulic analysis for Big Dry Creek was performed using the United States Corps of Engineers Hydrologic Engineering Center’s River Analysis System, or HEC-RAS, version 4.0 (Reference 113). Cross section data was obtained from previous Flood Hazard Area Delineation studies from 1986/1988 (Reference 114) and revised using 2008 LiDAR topography with 2-ft contour intervals (Reference 115). Channel roughness factors (Manning’s “n”) for these computations were determined through field

observations and typically ranged from 0.030 to 0.045 within the channel banks and 0.050 to 0.060 in the overbank areas. Starting water surface elevations were computed using step-backwater with normal depth as the starting condition.

Water-surface elevations (WSELs) of floods of the selected recurrence intervals for all steams studied by detailed methods, with the exception of the South Platte River, were computed using the USACE HEC-2 step-back water computer program (Reference 53).

For the South Platte River, the WSELs of floods of the selected recurrence intervals were computed using the NRCS WSP2 computer program (Reference 54). These profiles and elevations were compared with historic floods, and the flood stages were then determined.

City of Arvada

The basis of the hydraulic analysis utilized is from the Major Drainageway Planning Report and from the UDFCD plans entitled "Ralston Creek Flood Hazard Area Delineation Study" (Reference 55).

City of Edgewater

The drainageway between Depew Street and Sheridan Boulevard was studied to provide estimates of the elevation of the 1-percent-annual-chance flood. For the HEC-2 program, topographic data were taken from a topographic map with 1.0 foot contour intervals prepared by Greiner Engineering Sciences, Inc. and checked to ensure conformance with mapping standards (Reference 56). Field surveying was also conducted by Wright Water Engineers. From this topographic map, a total of 15 cross sections were digitized and used as data for the computer analysis. An analysis of flow in the stormwater channel between Ingalls Street and Depew Street is based on the Manning's Equation to estimate normal depth. A step-backwater analysis was used where necessary to reflect obstructions, such as culverts. Where bends occur in the channel, superelevation of the flow has been calculated and included in the WSELs. Culverts have been analyzed to determine the control condition, inlet or outlet control.

Because of irregular and poorly defined channels for street and overland flows in the area upstream on Ingalls Street and 20th Avenue, the resulting 1-percent-annual-chance floodplain for this area is not as well defined. Updated aerial mapping was used to determine "channel" cross sections and WSELs in this area.

Starting WSELs for Upper Sloans Lake Drainageway on the Sloans Lake WSEL developed from the 1-percent-annual-chance hydrograph volumes of various subdrainages and the stage-versus-storage relationships of the Lake.

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
AIRPORT CREEK						
At confluence with Big Dry Creek	2.39	550	-- *	1,250	1,590	2,860
At confluence with North Branch Airport Creek	1.06	350	-- *	780	850	1,491
At upstream study limit	0.43	340	-- *	690	815	1,348
APEX GULCH						
At confluence with Lena Gulch	1.47	390	-- *	680	830	1,250
ARAPAHOE GULCH						
At State Highway 93	0.48	-- *	-- *	-- *	487	-- *
Upstream of 2nd Street	0.64	-- *	-- *	-- *	743	-- *
Downstream of State Highway 58	0.71	-- *	-- *	-- *	903	-- *
BARBARA GULCH						
Upstream of West 82nd Avenue	2.06	408	602	865	1,117	1,685
Upstream of West 85th Place	1.43	292	437	624	806	1,205
Upstream of Union Pacific Railroad	0.68	118	185	266	344	513
BARBARA GULCH SPILL FLOW						
Downstream of Divergence from Barbara Gulch	-- *	N/A	N/A	62	137	303
BEAR CREEK						
Below Mt. Carbon Dam	239.00	500	-- *	1,000	1,000	2,000
Below confluence with Mount Vernon Creek	174.00	2,270	-- *	8,410	14,000	41,400
At USGS Gage at Morrison	164.00	2,180	-- *	8,140	13,500	39,900
Below confluence with Sawmill gulch	158.00	1,930	-- *	6,750	10,800	30,500
Below confluence with Swede Gulch	146.00	1,710	-- *	5,850	9,500	25,000
Above confluence with Myers Gulch	139.00	1,600	-- *	5,350	8,500	22,500

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
BEAR CREEK (CONTINUED)						
Above confluence with Troublesome Creek	126.00	1,390	-- *	4,500	7,100	17,750
Above confluence with Buffalo Creek	96.00	950	-- *	2,780	4,200	9,500
At Western Jefferson County Line	85.00	800	-- *	2,250	3,250	7,050
Below confluence with Mount Vernon Creek	174.00	2,270	-- *	8,410	14,000	41,400
Above confluence with Mount Vernon Creek USGS Gage No. 067105	164.00	2,180	-- *	8,140	13,500	39,900
BEAR CREEK TRIBUTARY NO. 1						
At mouth	0.59	145	-- *	385	510	980
At upstream limit of detailed study	0.14	45	-- *	115	155	285
BEAR CREEK TRIBUTARY NO. 2						
At mouth	0.69	100	-- *	290	385	670
BEAR CREEK TRIBUTARY NO. 3						
At Dedisee Park Road	0.41	120	-- *	310	415	760
BEAR CREEK TRIBUTARY NO. 5						
At Morrison Road	1.18	260	-- *	580	670	1,250
At Tributary confluence	0.69	150	-- *	320	380	660
BEAR CREEK TRIBUTARY NO. 6						
At mouth	1.53	650	-- *	920	1,040	1,333
BEAR CREEK TRIBUTARY NO. 7						
At mouth	0.64	170	-- *	375	465	690
BEAR CREEK (AT LAKEWOOD)						
At south Sheridan Boulevard (State Highway 95)	-- *	4,120	-- *	6,710	7,910	11,800

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
BERGEN CREEK						
At mouth	2.86	410	-- *	1,085	1,390	2,200
At upstream limit of detailed study	1.90	275	-- *	760	975	1,600
BIG DRY CREEK						
Upstream of confluence of Tanglewood Creek	34.5	4,640	-- *	8,280	9,760	12,630
Upstream of confluence of Quail Creek	33.6	4,510	-- *	7,930	9,220	11,690
At Willow Run Parkway	32.5	4,460	-- *	7,860	9,130	11,640
At Zuni Street	29.8	4,580	-- *	7,980	9,110	11,740
Confluence of Ranch Creek	24.3	4,170	-- *	7,000	7,980	11,080
2500 feet upstream of 120th Avenue	21.6	3,830	-- *	6,450	7,410	10,880
4600 feet upstream of 120th Avenue	20.6	3,750	-- *	6,300	7,220	10,750
5000 feet downstream of 112th Avenue	19.3	3,770	-- *	6,200	6,980	10,790
Upstream of 112th Avenue	18.4	3,690	-- *	6,030	6,780	12,830
At Sheridan Boulevard	18.2	3,650	-- *	5,950	6,720	12,930
Upstream of confluence of Airport Creek	15.9	3,210	-- *	5,780	6,580	12,990
2700 feet upstream of confluence of North City Park Creek	15.4	3,130	-- *	5,680	6,490	13,380
2100 feet downstream of confluence of South Branch Hylands Creek	15.1	3,000	-- *	5,410	6,390	13,440
Upstream of confluence of South Branch Hylands Creek	11.4	2,320	-- *	4,450	5,610	13,530
At US Highway 36	11.4	2,370	-- *	4,800	6,460	13,260
At confluence of Leyden Creek	5.0	1,330	-- *	2,670	3,090	13,280
2000 feet above confluence of Leyden Creek	3.7	1,000	-- *	2,110	2,810	13,330
900 feet upstream of Westcliff Parkway	2.9	840	-- *	1,560	2,270	13,330
At BNSF Railroad	2.9	1,080	-- *	2,250	3,030	13,430

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
BIG DRY CREEK (CONTINUED)						
At Wadsworth Parkway	0.7	260	-- *	980	1,820	13,400
700 feet Downstream of Standley Lake	0.5	250	-- *	970	1,790	13,400
Downstream of Standley Lake	0.0	150	-- *	730	1,470	13,460
BRANDYWINE CREEK						
Confluence with Nissen Reservoir Channel	0.42	88	-- *	211	262	489
BUFFALO CREEK						
At confluence with Sand Draw	46.70	370	-- *	540	630	840
CITY PARK CHANNEL						
At confluence with Nissen Reservoir Channel	5.68	770	-- *	1,300	1,500	2,250
CLEAR CREEK						
Above confluence with Tucker Gulch	403.80	3,470	-- *	8,010	12,420	27,430
Below confluence with Tucker Gulch	420.70	3,470	-- *	8,480	13,070	28,900
Above confluence with Ralston Creek	455.00	3,710	-- *	9,750	14,520	31,000
At Kipling Boulevard	450.00	3,280	-- *	9,000	13,470	29,850
At upstream limit of detailed study	325.00	3,280	-- *	9,000	13,470	29,850
COLD SPRING GULCH						
At mouth	5.07	655	-- *	1,630	2,070	4,025
0.40 mile above mouth	4.49	590	-- *	1,485	1,885	3,575
1.74 miles above mouth	1.99	285	-- *	750	960	1,900
COON CREEK						
At mouth	4.56	1,930	-- *	2,620	2,950	3,650
At Bowles Avenue	3.89	1,760	-- *	2,350	2,655	3,500

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
COON CREEK NORTH BRANCH						
At mouth	0.64	367	-- *	513	628	831
At South Simms Street	-- *	259	-- *	463	587	748
COUNTRYSIDE CREEK						
At confluence with Walnut Creek	1.13	300	-- *	660	840	1,479
At upstream study limit	0.60	235	-- *	520	620	1,090
CRESSMANS GULCH						
At confluence with Tucker Gulch	1.48	230	-- *	510	710	-- *
CUB CREEK						
At mouth	22.10	620	-- *	2,310	3,840	11,300
Above confluence with Little Cub Creek	19.20	570	-- *	2,120	3,520	10,400
Below Lans Gulch	17.90	540	-- *	2,030	3,370	9,950
DEER CREEK						
Above Chatfield Reservoir	31.50	770	-- *	2,890	4,790	14,200
Above confluence with Mill Creek	26.50	700	-- *	2,590	4,300	12,700
Below Rattlesnake Gulch	22.30	620	-- *	2,330	3,860	11,400
DEADMAN GULCH						
At confluence with West Fork Kenneys Run	0.30	90	-- *	200	260	-- *
DUTCH CREEK						
Below confluence with Lilley Gulch	9.70	2,950	-- *	4,000	4,465	5,600
Above confluence with Lilley Gulch	6.69	1,900	-- *	2,600	2,885	3,600
At Wadsworth Boulevard	6.07	1,800	-- *	2,450	2,700	3,400
At the Hogback	2.31	750	-- *	1,050	1,150	1,500

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
EAST FORK KENNEYS RUN						
At confluence with Kenneys Run	1.78	720	-- *	1,230	1,500	-- *
ELK CREEK						
At mouth	63.80	455	-- *	650	760	1,020
JACKSON GULCH						
At confluence with Lena Gulch	0.91	590	-- *	890	1,030	1,400
KENNEYS RUN						
At confluence with Clear Creek	5.62	1,620	-- *	3,300	4,020	-- *
KERRY GULCH						
At mouth	3.95	585	-- *	1,395	1,945	3,300
At confluence with Swede Gulch	1.84	310	-- *	660	1,040	1,900
At upstream limit of detailed study	0.96	175	-- *	460	590	1,180
LENA GULCH						
At U.S. Highway 6	3.68	1,000	-- *	1,800	2,200	3,300
At confluence with Apex and Jackson Gulches	2.38	900	-- *	1,500	1,810	2,600
LENA GULCH TRIBUTARY						
At mouth	0.39	140	-- *	285	350	570
LEYDEN CREEK						
At Simms Street	11.80	1,000	-- *	2,000	2,500	4,000
Below Leyden Lake	9.00	850	-- *	1,150	2,200	3,400
Above Leyden Lake	9.15	1,180	1,772	2,603	3,382	5,186
At Foothills Road	3.66	523	792	1,144	1,476	2,215

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
LILLEY GULCH						
At mouth	3.01	1,240	-- *	1,660	1,880	2,300
Above confluence with North Branch Lilley Gulch	1.88	1,150	-- *	1,540	1,720	2,050
At Simms Road	0.43	380	-- *	510	585	700
LITTLE CUB CREEK						
At mouth	2.83	300	-- *	885	1,180	2,000
MASSEY DRAW						
Upstream of Chatfield Reservoir	-- *	1,201	-- *	2,974	3,816	5,115
Downstream of South Kipling Parkway	-- *	848	-- *	2,185	2,752	3,555
At Upstream Limit of Study	-- *	508	-- *	1,581	1,989	2,470
MASSEY DRAW TRIBUTARY						
At Wadsworth Boulevard	0.99	585	-- *	820	920	1,200
At Garrison Road	0.53	370	-- *	515	570	700
MIDDLE BRANCH HYLANDS CREEK						
At confluence with South Branch Highlands Creek	1.27	480	-- *	1.050	1,280	2,237
At confluence with North Branch Highlands Creek	0.71	332	-- *	636	759	1,224
Eighth Green Pond Outflow	-- *	141	-- *	167	228	680
Lowell Pond Outflow	-- *	104	-- *	135	147	571
At upstream study limit	0.02	20	-- *	40	50	82
MIDDLE COTTON CREEK						
At confluence with Big Dry Creek	0.32	98	-- *	215	260	455

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
MIDDLE COTTON CREEK (CONTINUED)						
At upstream study limit	0.10	68	-- *	135	160	261
MOUNT VERNON CREEK						
At mouth	9.66	2,030	-- *	3,630	4,395	6,400
MEYERS GULCH						
At mouth	1.31	145	-- *	450	605	1,200
NISSEN RESERVOIR CHANNEL						
At confluence with Big Dry Creek	2.67	1,860	-- *	3,150	3,400	5,600
NORTH BRANCH HYLANDS CREEK						
At confluence with Middle Branch Highlands Creek	0.49	130	-- *	300	370	671
At upstream study limit	0.08	78	-- *	155	190	319
NORTH BRANCH LILLEY GULCH						
Downstream of Johnson Reservoir	-- *	3	-- *	77	118	369
At South Wadsworth Boulevard	-- *	263	-- *	475	593	747
NORTH BRANCH WALNUT CREEK						
At confluence with Walnut Creek	1.14	150	-- *	410	520	1,024
At upstream study limit	0.62	170	-- *	410	510	960
NORTH CITY PARK CREEK						
At confluence with Big Dry Creek	0.14	29	-- *	85	107	230
At upstream study limit	0.04	19	-- *	55	65	180
NORTH COTTON CREEK						
At confluence with Big Dry Creek	0.30	111	-- *	248	300	532

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
NORTH COTTON CREEK (CONTINUED)	0.10	30	-- *	80	105	212
At upstream study limit						
NORTH FORK SOUTH PLATTE RIVER						
At the USGS South Platte Gage	479.00	1,610	-- *	2,310	2,690	3,630
Below confluence with Elk Creek	374.00	1,375	-- *	1,980	2,300	3,100
Above confluence with Elk Creek	310.00	1,220	-- *	1,760	2,050	2,760
NORTH TURKEY CREEK						
At downstream limit of detailed study	18.22	N/A	N/A	N/A	1,410	3,000
At upstream limit of detailed study	3.78	N/A	N/A	N/A	225	410
NORTH FORK OF WEST FORK KENNEYS RUN TRIBUTARY NO. 1						
At confluence with West Fork Kenneys Run Tributary No. 1	0.26	50	-- *	140	190	-- *
PARMALEE GULCH						
At mouth	5.96	875	-- *	2,320	2,675	3,500
At confluence with Giant Gulch	4.39	680	-- *	1,810	2,100	2,800
PINE GULCH						
At mouth	4.30	195	-- *	845	1,180	2,100
QUAIL CREEK						
Upstream of Interstate Highway 25	-- *	-- *	-- *	-- *	1,900	-- *
RALSTON CREEK						
Below Confluence with Van Bibber Creek	-- *	4,091	-- *	7,932	9,700	13,200
Above Confluence with Leyden Creek	-- *	1,997	-- *	3,779	4,588	8,061
Below Arvada/Blunn Reservoir	-- *	272	-- *	3,052	4,440	8,272

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
RANCH CREEK						
At confluence with Big Dry Creek	1.98	850	-- *	1,800	2,200	3,760
At confluence with South Branch Ranch Creek	0.69	520	-- *	975	1,200	1,886
At upstream study limit	0.11	150	-- *	265	325	490
ROONEY GULCH						
At Morrison Road	4.03	1,670	-- *	2,600	3,010	4,100
2 miles upstream of mouth	2.60	1,200	-- *	1,800	2,080	2,700
SAND DRAW						
At mouth	1.60	160	-- *	515	675	1,150
SAWMILL GULCH						
At mouth	2.28	730	-- *	1,565	1,930	3,000
SJCD 6100						
At Sheridan Boulevard	1.24	700	-- *	870	940	1,100
At Wadsworth Boulevard	0.32	240	-- *	340	390	500
SJCD 6200						
At Platte Canyon Road	3.04	1,590	-- *	2,150	2,440	3,000
At Wadworth Boulevard	2.02	1,245	-- *	1,675	1,895	2,400
SJCD 6200 NORTH TRIBUTARY						
At Nevada Ditch Crossing	0.88	600	-- *	830	940	1,190
At South Newland Street	0.43	430	-- *	620	700	900
SLOANS LAKE BASIN DRAINAGE						
West 18th Avenue at Sheridan Boulevard	2.07	-- *	-- *	-- *	1,075	-- *

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
SLOANS LAKE BASIN DRAINAGE (CONTINUED)	-- *	-- *	-- *	-- *		-- *
West 20th Avenue at Ingalls Street					1,000	
West 20th Avenue at Kendall Street	-- *	-- *	-- *	-- *	820	-- *
West 20th Avenue at Newland Street	-- *	-- *	-- *	-- *	670	-- *
25th Avenue at Pierce Street	-- *	-- *	-- *	-- *	350	-- *
SOUTH BRANCH HYLANDS CREEK						
At confluence with Big Dry Creek	3.46	1,120	-- *	2,390	2,940	5,047
At confluence with Tributary A	2.17	691	-- *	1,443	1,765	2,987
SOUTH BRANCH RANCH CREEK						
At confluence with Ranch Creek	0.70	300	-- *	625	750	1,265
At upstream study limit	0.42	270	-- *	550	650	1,078
SOUTH CITY PARK CREEK						
At confluence with Big Dry Creek	0.09	20	-- *	54	68	138
At upstream study limit	0.02	10	-- *	30	40	88
SOUTH COTTON CREEK						
At confluence at Big Dry Creek	0.19	46	-- *	113	140	265
At upstream study limit	0.10	35	-- *	90	113	221
SOUTH LAKEWOOD GULCH						
At confluence with Lakewood Gulch	1.90	-- *	-- *	-- *	876	-- *
At Wadsworth Boulevard	1.30	-- *	-- *	-- *	642	-- *
Downstream of Devinney Reservoir	0.80	-- *	-- *	-- *	130	-- *
Upstream of Devinney Reservoir	0.80	-- *	-- *	-- *	530	-- *

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
SOUTH PLATTE RIVER						
At downstream limit of detailed study	2,018.00	2,950	-- *	4,600	5,400	7,700
At upstream limit of detailed study	1,805.00	2,900	-- *	4,500	5,300	7,500
SWEDE GULCH						
At mouth	1.45	250	-- *	620	845	1,600
SWITZERS GULCH						
At mouth	1.57	405	-- *	850	1,050	1,810
0.8 mile upstream of mouth	0.59	215	-- *	460	565	940
TANGLEWOOD CREEK						
At confluence with Big Dry Creek	1.12	340	-- *	758	934	1,655
At upstream study limit	0.11	105	-- *	217	253	424
TRIBUTARY "B" OF LITTLE DRY CREEK						
At downstream study limit	0.82	420	-- *	700	850	1,200
At upstream study limit	0.56	270	-- *	460	550	820
TROUBLESOME CREEK						
At mouth	9.06	1,280	-- *	3,330	4,240	7,000
Above confluence with Bergen Creek	3.05	470	-- *	1,195	1,525	2,400
TUCKER GULCH						
At confluence with Clear Creek	11.43	820	-- *	1,900	2,800	-- *
Above confluence with Cressmans Gulch	9.62	640	-- *	1,600	2,300	-- *
TURKEY CREEK						
At USGS Gage near Morrison	50.10	1,040	-- *	3,870	6,420	19,000

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
TURKEY CREEK (CONTINUED)	44.10	960	-- *	3,570	5,920	17,500
Above confluence with Parmalee Gulch						
VAN BIBBER CREEK						
At mouth	17.52	1,620	-- *	2,800	3,430	5,000
Below South Van Bibber Creek Tributary	13.63	1,260	-- *	2,200	2,750	4,000
At the Hogback	8.29	880	-- *	1,350	1,570	2,100
VAN BIBBER CREEK TRIBUTARY						
At mouth	2.57	780	-- *	1,250	1,400	1,900
At Foothills Road	0.72	260	-- *	450	540	780
WALNUT CREEK						
At confluence with Big Dry Creek	10.53	800	-- *	2,050	2,600	5,086
At Colorado and Southern Railroad	-- *	-- *	-- *	-- *	-- *	-- *
At confluence with Countryside Creek	9.79	800	-- *	1,300	1,700	3,367
At confluence with North Branch Walnut Creek	6.87	175	-- *	400	500	902
At upstream study limit	5.51	150	-- *	360	430	800
At Great Western Reservoir Outflow	5.00	100	-- *	260	320	-- *
At Great Western Reservoir Inflow	5.00	1,530	-- *	3,210	3,910	6,660
WEAVER CREEK						
At West Hampden Avenue	5.11	1,820	-- *	2,515	2,820	3,550
At upstream limit of detailed study	1.99	200	-- *	285	300	415
WEST FORK KENNEYS RUN						
Above 20th Street	3.43	770	-- *	1,610	2,010	-- *

* Data Not Available

Table 3: Summary of Discharges

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second) 10-percent	4-percent	2-percent	1-percent	0.2-percent
WEST FORK KENNEYS RUN TRIBUTARY NO. 1						
At confluence with West Fork Kenneys Run	1.00	170	-- *	460	620	-- *
WEST FORK KENNEYS RUN TRIBUTARY NO. 2						
At confluence with West Fork Kennys Run	0.36	90	-- *	240	330	-- *
WILMOT CREEK						
At mouth	1.73	360	-- *	900	1,175	1,850
Above confluence with Wilmot Creek Tributary	0.56	100	-- *	285	380	650
WILMOT CREEK TRIBUTARY						
At mouth	0.61	150	-- *	375	490	830
At upstream limit of detailed study	0.26	55	-- *	160	215	390

* Data Not Available

City of Golden

The cross sections used in the backwater analyses of the streams were obtained from a number of sources. Cross sections on Clear Creek were compiled by Bell Mapping Company using photogrammetric methods for the flood hazard area delineation by Gingery and Associates, Inc. (Reference 57). Cross sections on Tucker Gulch, Cressmans Gulch, Cressmans Gulch Old Channel, Kenneys Run, East Fork Kenneys Run, West Fork Kenneys Run, West Fork Kenneys Run Tributary No. 1, North Fork of West Fork Kenneys Run Tributary No. 1, West Fork Kenneys Run Tributary No. 2, and Deadman Gulch were digitized by photogrammetric methods using aerial photographs at a scale of 1:6,000 (Reference 58). Cross sections on Apex, Jackson, and Lena Gulches were compiled by the Olympus Mapping Company for a report by Wright-McLaughlin Engineers, by photogrammetric methods, using maps at a scale of 1:1,200, with a contour interval of 2 feet (Reference 47).

Data for the bridges, culverts, and other hydraulic structures in Golden were obtained from a number of sources. The data for all detailed-study streams except Clear Creek and Apex, Jackson, and Lena Gulches were obtained from field surveys. The data for Clear Creek were furnished by Bell Mapping Company and Norman Associates for Gingery and Associates, Inc. (Reference 57). The data for Apex, Jackson, and Lena Gulches were furnished by Olympus Mapping Company for a report by Wright-McLaughlin Engineers (Reference 47).

The starting WSEL was set at critical depth for Clear Creek and Lena, Apex, and Jackson Gulches. For all other stream reaches, the slope-area method was used to begin the backwater calculations.

On Clear Creek, WSELs were computed based on results from the Gingery and Associates, Inc., study (Reference 57). These results were modified at Ford Street and downstream through the Coors Brewery, where the topographical configuration has changed. At Ford Street, for example, the channel and overbank flows were handled separately. The resulting WSELs in the channel at Ford Street and Washington Avenue were input to the HEC-2 model considering only the channel as an effective flow area and modifying the discharges accordingly. The 2- and 0.2-percent-annual-chance flood WSELs were extrapolated from the 10- and 1-percent-annual-chance flood elevations. Other changes have been made to the Gingery and Associates, Inc., study, with UDFCD approval, upstream of U.S. Highway 6.

The 2- and 0.2-percent-annual-chance flood WSELs were not computed for Cressmans Gulch, Cressmans Gulch Old Channel, Tucker Gulch, Kenneys Run, East Fork Kenneys Run, West Fork Kenneys Run, West Fork Kenneys Run Tributary No. 1, North Fork of West Fork Kenneys Run Tributary No. 1, West Fork Kenneys Run Tributary No. 2, and Deadman Gulch.

On Apex Gulch, spillage onto the overbank areas results in shallow 1-percent-annual-chance flooding. This shallow flooding was determined using engineering judgment.

Along South Golden and Jackson Streets, between East Fork and West Fork Kenneys Run, floodwater being forced over streets becomes hydraulically disconnected from the

channel with the streets acting as drainageways. Flows exceeding street capacities have been designated as Zone AO (Depth 1.0 foot) and will threaten residential properties in this area. The approximate studies were developed using cross sections from a USGS topographic quadrangle map (Reference 59) and a computer program that generates a top width for each section based on cross section geometry, discharge value, energy gradeline slope, and roughness factor. The computed top width corresponds to flow at normal depth in the cross section.

Jefferson County (Unincorporated Areas)

For several streams previously studied by the UDFCD, the existing 10- and 1-percent-annual-chance water-surface profiles were utilized to expand the UDFCD studies to conform with FIS Guidelines. An interpolation-extrapolation procedure was used to develop the 2- and 0.2-percent-annual-chance WSELs at each cross section. This procedure was based on the assumption that there is a linear relationship between the logarithm of stream discharge and the logarithm of WSEL.

Cross-section data were obtained from various topographic maps. At some locations, field-surveyed cross sections and improvement plans were used to supplement the topographic mapping. The various sources used to obtain cross-section data are presented in Table 4, "Sources of Topographic Mapping in Jefferson County."

The cross section data for the South Platte River, as adopted from the Douglas County FIS (Reference 20), were obtained by field survey.

Flood depths for approximate studies were computed from nomographs contained in "Technical Manual No. 1: Manual for Estimating Flood Characteristics of Natural-Flow Streams in Colorado," prepared by the CWCB and the USGS (Reference 78).

Town of Morrison

The cross sections used in the hydraulic analysis of the Bear and Mount Vernon Creek study areas were taken primarily from the USACE report (Reference 51) after field checking at several locations for channel invert accuracy and addition of new structures. The topography from this report was used to determine the cross sections for the channel area of Bear Creek Tributary No. 7.

City of Westminster

The results obtained from the HEC-2 program were adjusted in the vicinity of bridges to more accurately represent actual flooding conditions. Starting WSELs were based on hand calculations at control sections, obtained by the slope area method, or determined for a tributary to a major stream from the major stream at concurrent flows.

Table 4: Sources of Topographic Mapping in Jefferson County

Hogan/Olhausen, Inc., Topographic Maps, Jefferson County (References 60 and 61)	Bear Creek (Kittredge to Evergreen) [1] Bear Creek Tributary No. 1 Bear Creek Tributary No. 2 Bear Creek Tributary No. 3 Bergen Creek [1] Buffalo Creek Cub Creek Elk Creek (At Pine) Little Cub Creek Myers Gulch North Fork South Platte River [1] North Turkey Creek [1] Pine Gulch [1] Sand Draw [1] Troublesome Creek Wilmot Creek Wilmot Creek Tributary
U.S. Geological Survey, 7.5-Minute Series Topographic Maps (References 62 and 63)	Bear Creek (Above Evergreen Lake) [1] Big Dry Creek [1] Cold Spring Gulch [1] Cub Creek [1] Elk Creek (Above Sphinx Park) [1] Kerr Gulch Swede Gulch [1] Switzers Gulch Van Bibber Creek [1]
Bell Mapping Company, Topographic Maps, Clear Creek (Reference 64)	Clear Creek
Delta Aerial Surveys, Topographic Maps, Dutch Creek, Lilley Gulch, Coon Creek (Reference 65)	Coon Creek [1] Dutch Creek [1] Lilley Gulch North Branch Coon Creek
Olympus Aerial Surveys, Topographic Maps, Lena Gulch (Reference 66)	Lena Gulch [1]
M&I, Inc., Topographic Maps, Leyden Creek (Reference 67)	Leyden Creek

[1] Supplemented with field surveys

Table 4: Sources of Topographic Mapping in Jefferson County (continued)

Bell Mapping Company, Topographic Maps, Van Bibber Creek (Reference 69)	Van Bibber Creek Van Bibber Tributary
Delta Aerial Surveys, Topographic Maps, Green Mountain Area (Reference 69)	Bear Creek Tributary No. 5 Bear Creek Tributary No. 6 Rooney Gulch
Delta Aerial Surveys, Topographic Maps, Massey Draw and SJCD (Reference 70)	Massey Draw Tributary SJCD 6200
Bell Mapping Company, Topographic Maps, SJCD 6100 and 6200 (Reference 71)	SJCD 6100 [1,2] SJCD 6200 North Tributary [2]
Landmark Mapping Company, Topographic Maps, Southern Jefferson County (Reference 72)	Bear Creek (At Morrison) Bear Creek (At Idledale) Deer Creek Mount Vernon Creek Parmalee Gulch Sawmill Gulch Turkey Creek (Above Bear Creek) Turkey Creek (Above Tiny Town)
Merrick & Company, Topographic Maps, Weaver Creek (Reference 73)	Weaver Creek
Scharf and Associates, Inc., Topographic Maps, Bear Creek (Reference 74)	Bear Creek (Below Mt. Carbon Dam)
Colorado Department of Highways, Highway Lighting Plan (Reference 75)	Clear Creek
Kucera & Associates, Inc., Topographic Maps, Lena Gulch Tributary (Reference 76)	Lena Gulch Tributary [2]
Northway-Gestalt Company, Lena Gulch Plans (Reference 77	Lena Gulch [1]

[1] Supplemented with field surveys
[2] Supplemented with construction drawings

Cross sections used in the backwater analyses for all streams were obtained by aerial photogrammetry (Reference 79). The below water sections of all cross sections were obtained by field measurement.

Roughness coefficients (Manning's "n" values) for the flooding sources were estimated by field inspection. The channel and overbank roughness value ranges for each stream are given in Table 5, "Manning's "n" Values."

Table 5: Manning's "n" Values

Stream	Channel	Overbanks
Airport Creek	0.020-0.065	0.020-0.100
Apex Gulch	0.025-0.040	0.030-0.040
Arapahoe Gulch	0.015-0.130	0.015-0.130
Barbara Gulch	0.013-0.050	0.015-0.060
Barbara Gulch Spill Flow	0.045-0.050	0.045-0.050
Bear Creek (below Mt. Carbon Dam)	--[1]	--[1]
Bear Creek (At Morrison)	0.015-0.055	0.050-0.200
Bear Creek (At Idledale)	0.040	0.050-0.150
Bear Creek (Kittredge to Evergreen)	0.035-0.040	0.020-0.060
Bear Creek (Above Evergreen Lake)	0.035-0.040	0.040-0.055
Bear Creek Tributary Number 1	0.030-0.060	0.030-0.060
Bear Creek Tributary Number 2	0.030-0.060	0.030-0.060
Bear Creek Tributary Number 3	0.030-0.060	0.030-0.050
Bear Creek Tributary Number 4	0.030-0.060	--[1]
Bear Creek Tributary Number 5	0.035	0.040
Bear Creek Tributary Number 6	--[2]	--[2]
Bear Creek Tributary Number 7	0.050-0.150	0.050-0.150
Bergen Creek	0.035-0.040	0.020-0.060
Big Dry Creek	0.030-0.045	0.050-0.060
Brandywine Creek	0.020-0.065	0.020-0.100

[1] Data not available
[2] Profiles adapted from previously published reports; no Roughness Values used

Table 5: Manning's "n" Values (continued)

Stream	Channel	Overbanks
Buffalo Creek	0.040-0.065	0.045-0.080
City Park Channel	0.020-0.065	0.020-0.100
Clear Creek	0.025-0.045	0.040-0.070
Cold Spring Gulch	0.035-0.070	0.035-0.450
Coon Creek	--[2]	--[2]
Countryside Creek	0.020-0.065	0.020-0.100
Cressmans Gulch	0.025-0.040	0.030-0.040
Cub Creek	0.030-0.040	0.020-0.050
Deadman Gulch	0.025-0.040	0.030-0.040
Deer Creek	0.040-0.050	0.040-0.050
Dutch Creek	--[2]	--[2]
East Fork Kenneys Run	0.025-0.040	0.030-0.040
Elk Creek	0.030-0.070	0.030-0.070
Jackson Gulch	--[1]	--[1]
Kenneys Run	--[1]	--[1]
Kerr Gulch	0.050	0.035-0.050
Lena Gulch	--[2]	--[2]
Lena Gulch Tributary	0.030-0.035	0.030-0.040
Leyden Creek	0.020-0.1	0.015-0.080
Lilley Gulch	--[2]	--[2]
Little Cub Creek	0.040	0.020-0.060
Massey Draw Tributary	0.040	0.045
Middle Branch Hylands Creek	0.020-0.065	0.020-0.100
Middle Cotton Creek	0.020-0.065	0.020-0.100
Mount Vernon Creek	0.040-0.055	0.040-0.200
Myers Gulch	0.024-0.055	0.030-0.050

[1] Data not available
[2] Profiles adapted from previously published reports; no Roughness Values used

Table 5: Manning's "n" Values (continued)

Stream	Channel	Overbanks
Nissen Reservoir Channel	0.020-0.065	0.020-0.100
North Branch Hylands Creek	0.020-0.065	0.020-0.100
North Branch Walnut Creek	0.020-0.065	0.020-0.100
North City Park Creek	0.020-0.065	0.020-0.100
North Cotton Creek	0.020-0.065	0.020-0.100
North Branch Coon Creek	--[2]	--[2]
North Fork of West Fork Kenneys Run Tributary No. 1	0.025-0.040	0.030-0.040
North Fork South Platte River	0.035	0.050
North Turkey Creek	0.030	0.035
Parmalee Gulch	0.150-0.050	0.030-0.050
Pine Gulch	0.040	0.045
Ralston Creek	0.018-0.040	0.040-0.100
Ranch Creek	0.020-0.065	0.020-0.100
Rooney Gulch	--[2]	--[2]
Sand Draw	0.040	0.020-0.040
Sawmill Gulch	0.030-0.060	0.040
SJCD 6100	0.030-0.035	0.070
SJCD 6200 North Tributary	0.030	0.030-0.040
SJCD 6200	0.040	0.035
South Platte River	0.030-0.045	0.045
Sloans Lake Basin Drainage	0.015-0.035	0.030-0.100
South Branch Hylands Creek	0.020-0.065	0.020-0.100
South Branch Ranch Creek	0.020-0.065	0.020-0.100
South City Park Creek	0.020-0.065	0.020-0.100
South Cotton Creek	0.020-0.065	0.020-0.100
Swede Gulch	0.030	0.016-0.120

[2] Profiles adapted from previously published reports; no Roughness Values used

Table 5: Manning's "n" Values (continued)

Stream	Channel	Overbanks
Switzers Gulch	0.030-0.040	0.060
Tanglewood Creek	0.020-0.065	0.020-0.100
Tributary "B" of Little Dry Creek	0.020-0.065	0.020-0.100
Troublesome Creek	0.020-0.055	0.04-0.050
Tucker Gulch	0.025-0.040	0.030-0.040
Turkey Creek	0.030-0.050	0.028-0.075
Van Bibber Creek	0.027-0.060	0.030-0.050
Van Bibber Creek Tributary	0.027-0.060	0.030-0.100
Walnut Creek	0.020-0.065	0.020-0.100
Weaver Creek	0.030-0.050	0.035-0.100
West Fork Kenneys Run	0.025-0.040	0.030-0.040
West Fork Kenneys Run Tributary No. 1	0.025-0.040	0.030-0.040
West Fork Kenneys Run Tributary No. 2	0.025-0.040	0.030-0.040
Wilmot Creek	0.024-0.050	0.030-0.060
Wilmot Creek Tributary	0.030-0.032	0.030-0.032

All hydraulically significant structures were field checked to verify elevation data and structural geometry, and modifications have been made where significant changes have occurred.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the FIRM (Exhibit 2).

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

ERMs shown on the FIRM represent those used during the preparation of this and previous Flood Insurance Studies. The elevations associated with each ERM were obtained and/or developed during FIS production to establish vertical control for determination of flood elevations and floodplain boundaries shown on the FIRM. Users should be aware that these ERM elevations may have changed since the publication of this FIS. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD). With the completion of the North American Vertical Datum of 1988 (NAVD), many FIS reports and FIRMs are now prepared using NAVD as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. It is important to note that adjacent counties may be referenced to NGVD. This may result in differences in base flood elevations across county lines.

As noted above, the elevations shown in the FIS report and on the FIRM for Jefferson County and Incorporated Areas are referenced to NAVD88. Ground, structure, and flood elevations may be compared and/or referenced to NGVD by applying a standard conversion factor.

The conversion from NGVD29 to NAVD88 ranged between 3.0 and 3.86 feet for this county. According to Appendix B of the FEMA Guidelines and Specifications, due to the range in conversion factors, stream by stream conversion factors were established for the

entire county. The elevations shown in the FIS report and the FIRM were therefore converted to NAVD88 using a stream by stream approach in which an average conversion was established for each stream studied by detailed methods. A table of the stream by stream conversion factors is included herein.

The BFE values shown on the FIRM represent whole-foot rounded values. For example, a BFE of 5602.4 feet will appear as 5602 feet on the FIRM and 5602.6 feet will appear as 5603 feet. Therefore, users who wish to convert the elevations in this FIS to NGVD should apply the stated conversion factor to elevations shown on the Flood Profiles and supporting data tables in the FIS report, which are shown at a minimum to the nearest 0.1 foot.

For more information regarding conversion between the NGVD and NAVD, see the FEMA publication entitled *Converting the National Flood Insurance Program to the North American Vertical Datum of 1988* (FEMA Publication Fia 20, June 1992), Or contact the Vertical Network Branch, National Geodetic Survey, Coastal and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

Qualifying bench marks within a given jurisdiction that are cataloged by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B, or C are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier.

Table 6: Vertical Datum Stream by Stream Conversion

(NGVD29 + Conversion Factor = NAVD88)

Stream Name	Conversion Factor
Airport Creek	3.07
Apex Gulch	3.27
Bear Creek - (Below Mt. Carbon Dam)	3.09
Bear Creek - (Kittridge to Evergreen)	3.55
Bear Creek (Above Evergreen Lake)	3.78
Bear Creek (at Idledale)	3.37
Bear Creek (at Lakewood)	3.05
Bear Creek (at Morrisson)	3.19
Bear Creek Tributary 5	3.13
Bear Creek Tributary 6	3.10

Table 6: Vertical Datum Stream by Stream Conversion (continued

(NGVD29 + Conversion Factor = NAVD88)

Stream Name	Conversion Factor
Bear Creek Tributary 7	3.20
Bear Creek Tributary Number 3	3.62
Bergen Creek	3.64
Big Dry Creek – Upstream of Standley Lake	3.47
Buffalo Creek	3.74
City Park Channel	3.03
Clear Creek	3.17
Cold Springs Gulch	3.55
Coon Creek	3.08
Coon Creek North Branch	3.10
Countryside Creek	3.15
Cressmans Gulch	3.25
Cub Creek	3.80
Deadman Gulch	3.25
Deer Creek	3.19
Dry Gulch	3.07
East Fork Kenneys Run Tributary 1	3.18
Elk Creek	3.82
Jackson Gulch	3.26
Kenneys Run	3.19
Kerr Gulch	3.58
Lakewood Gulch	3.08
Lena Gulch	3.16
Lena Gulch Tributary	3.15
Leyden Creek	3.53
Lilley Gulch	3.09
Little Cub Creek	3.63
Massey Draw	3.12

Table 6: Vertical Datum Stream by Stream Conversion (continued

(NGVD29 + Conversion Factor = NAVD88)

Stream Name	Conversion Factor
Massey Draw Tributary	3.10
McIntyre Gulch	3.07
Middle Branch Hylands Creek	3.06
Middle Cotton Creek Upstream of Big Dry Creek	3.03
Mount Vernon Creek	3.22
Myers Gulch	3.50
North Branch Airport Creek	3.08
North Branch Hylands Creek	3.05
North Branch Lilley Gulch	3.08
North Branch Walnut Creek	3.20
North City Park Creek	3.04
North Cotton Creek	3.03
North Fork of West Fork Kenneys Run Tributary 1	3.25
North Fork South Platte River	3.81
North Sanderson Gulch	3.04
North Turkey Creek	3.86
Parmalee Gulch	3.44
Pine Gulch	3.82
Quail Creek	3.00
Ralston Creek	3.30
Ranch Creek	3.02
Rooney Gulch	3.20
Sand Draw	3.73
Sanderson Gulch	3.04
Sanderson Gulch Upstream of Ag Ditch	3.07
Sawmill Gulch	3.37
SJCD 6100	3.06

Table 6: Vertical Datum Stream by Stream Conversion (continued

(NGVD29 + Conversion Factor = NAVD88)

Stream Name	Conversion Factor
Sloans Lake Basin	3.06
South Branch Hylands Creek	3.07
South Branch Ranch Creek	3.03
South Cotton Creek	3.03
South Lakewood Gulch	3.07
South Platte River	3.67
Switzers Gulch	3.47
Tanglewood Creek	3.00
Tributary B Little Dry Creek	3.15
Troublesome Creek	3.69
Tucker Gulch	3.23
Turkey Creek - Upstream of 470	3.20
Turkey Creek - Upstream of Morrison	3.40
Unknown - south of Fed Center	3.22
Unknown - trib to Wilmont	3.69
Unnamed Tributary to Bear Creek	3.59
Unnamed Tributary to Dry Gulch	3.06
Upper Sloans Lake Basin Drainageway	3.06
Van Bibber Creek	3.19
Van Bibber Creek Tributary	3.22
Walnut Creek	3.16
Weaver Creek	3.14
Weir Gulch	3.04
Weir Gulch Tributary - North	3.05
Weir Gulch Tributary - South	3.04
West Fork Kenneys Run	3.21
West Fork Kenneys Run Tributary 1	3.24
West Fork Kenneys Run Tributary 2	3.25

Table 6: Vertical Datum Stream by Stream Conversion (continued

(NGVD29 + Conversion Factor = NAVD88)

Stream Name	Conversion Factor
Wilmont Creek	3.67

Bench marks catalogued by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/elevation well (e.g., mounted in bedrock)
- Stability B: Monuments which generally hold their position/elevation well (e.g., concrete bridge abutments)
- Stability C: Monuments which may be affected by surface ground movements (e.g., concrete monument below frost line)
- Stability D: Mark of questionable or unknown vertical stability (e.g., concrete monument above frost line or steel witness post)

To obtain up-to-date elevation information on NGS bench marks shown on the FIRM, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS monument elevations when using these elevations for construction or floodplain management purposes.

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS report provides 1-percent-annual-chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent-annual-chance flood elevations; delineations of the 1- and 0.2-percent-annual-chance floodplains; and a 1-percent-annual-chance floodway. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data tables, and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS report as well as additional information that may be available at the local community map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management

purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed or limited detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section.

Between cross sections, the boundaries were interpolated using topographic maps. The topographic map sources used in the FIS report for each community are described in the following sections.

City of Arvada

Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 feet, with a contour interval of 2 feet (References 37, 49, 55, 80, and 82).

City of Edgewater

Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:100, with a contour interval of 1.0 foot (References 3 and 50).

City of Golden

For Clear Creek and Apex, Jackson, and Lena Gulches, the boundaries of the 1- and 0.2-percent-annual-chance floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at scales of 1:1,200 and 1:2,400, with contour intervals of 2 and 5 feet (References 82 and 83).

The 1-percent-annual-chance flood boundaries for Cressmans Gulch, Cressmans Gulch Old Channel, Tucker Gulch, Kenneys Run, East Fork Kenneys Run, West Fork Kenneys Run, West Fork Kenneys Run Tributary No. 1, North Fork of West Fork Kenneys Run Tributary No. 1, West Fork Kenneys Run Tributary No. 2, and Deadman Gulch were taken from "Flood Hazard Area Delineation – Tucker Gulch/Kenneys Run" (Reference 6).

For all streams studied by approximate methods, the boundaries of the 1-percent-annual-chance flood have been delineated using the topwidths calculated at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000, with a contour interval of 40 feet (Reference 59).

Jefferson County (Unincorporated Areas)

Between cross sections, the boundaries were interpolated using topographic maps at scales of 1:1,200, 1:2,400, 1:4,800, and 1:24,000, with contour intervals of 1, 2, 10, and 40 feet (References 60 through 77). The referenced topographic maps were also used to delineate approximate flood boundaries.

Town of Morrison

Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,400, with a contour interval of 2 feet (Reference 79).

City of Westminster

Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,400 feet, with a contour interval of 2 feet (Reference 79).

The 1- and 0.2-percent-annual-chance floodplain boundaries for streams studied by detailed methods are shown on the FIRM. On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, and AO), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations, but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For streams studied by approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 2).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the base flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and provided in Table 7, “Floodway Data.” The computed floodway is shown on the FIRM (Exhibit 2). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown on the FIRM.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation (WSEL) of the base flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

The State of Colorado's Department of Natural Resources Colorado Water Conservation Board passed "Rules and Regulations for Regulatory Floodplains in Colorado" (Rules) in January 2011. The new Rules include provisions that exceed the NFIP minimum regulations. However, these rules are not yet in effect for Jefferson County or incorporated communities within Jefferson County. Therefore, this FIS and DFIRM panels reflect the NFIP minimum regulations at this time.

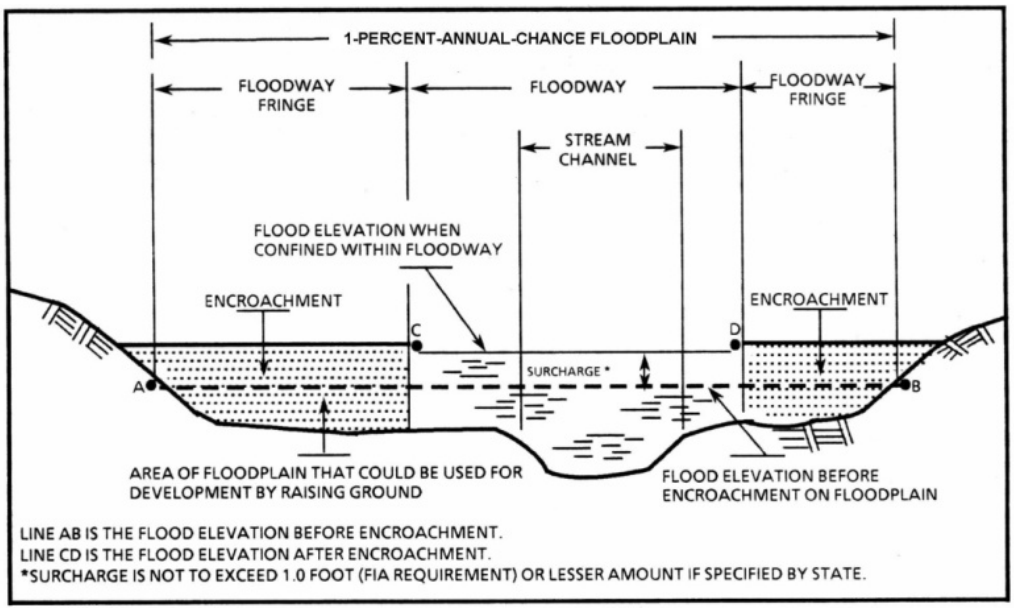

Figure 1. Floodway Schematic

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AIRPORT CREEK								
A	490	97	181	7.3	5,256.1	5,256.1	5,256.1	0.0
B	960	123	171	7.7	5,264.8	5,264.8	5,265.0	0.2
C	2,045	78	329	4.0	5,280.9	5,280.9	5,281.0	0.1
D	2,910	45	188	6.5	5,283.2	5,283.2	5,283.7	0.5
E	4,800	77/450[2]	175	5.5	5,298.7	5,298.7	5,298.7	0.0
F	5,575	59	194	7.1	5,307.3	5,307.3	5,307.3	0.0
G	5,760	67	188	7.3	5,309.7	5,309.7	5,309.7	0.0
H	6,570	56	152	9.0	5,319.4	5,319.4	5,319.4	0.0
I	7,300	55	155	8.6	5,328.8	5,328.8	5,328.8	0.0

[1] Feet above mouth
[2] Width/width including detention pond

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Airport Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
APEX GULCH								
A	680	31	87	9.5	6,150.3	6,150.3	6,150.3	0.0
B	1,425	31	86	9.7	6,211.9	6,211.9	6,212.8	0.9
C	1,660	29	85	9.8	6,227.9	6,227.9	6,228.9	1.0
D	2,150	40	94	8.8	6,268.3	6,268.3	6,268.3	0.0
E	2,320	32	88	9.4	6,274.4	6,274.4	6,274.6	0.2

[1] Feet above confluence with Lena Gulch

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Apex Gulch

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BARBARA GULCH								
A	676	33	108	10.3	5667.7	5667.7	5667.9	0.2
B	1733	91	151	7.4	5683.6	5683.6	5683.6	0.0
C	2618	61	163	6.9	5694.2	5694.2	5694.4	0.2
D	3613	46	96	8.4	5708.5	5708.5	5708.5	0.0
E	4519	60	113	7.2	5726.0	5726.0	5726.2	0.2
F	5648	98	124	6.5	5752.3	5752.3	5752.3	0.0
G	6861	70	125	6.5	5778.1	5778.1	5778.2	0.1
H	8193	77	127	6.3	5803.0	5803.0	5803.0	0.0
I	9298	26	80	10.1	5826.5	5826.5	5826.8	0.3
J	10,547	124	132	6.1	5871.6	5871.6	5871.6	0.0
K	11,569	39	98	8.2	5886.9	5886.9	5887.0	0.1
L	12,560	192	1813	0.2	5929.5	5929.5	5929.8	0.3
M	13,686	41	53	6.5	5943.9	5943.9	5943.9	0.0
N	15,017	35	50	6.8	5981.5	5981.5	5981.5	0.0
O	16,244	21	41	7.9	6021.6	6021.6	6021.9	0.3
P	17,728	124	974	0.7	6094.0	6094.0	6094.0	0.0
Q	18,977	16	39	8.9	6111.9	6111.9	6111.9	0.0
R	19,932	78	554	0.1	6160.9	6160.9	6160.9	0.0
S	20,681	56	133	4.9	6183.9	6183.9	6183.9	0.0
T	21,812	34	60	4.4	6216.3	6216.3	6216.3	0.0
U	22,723	17	17	4.1	6231.6	6231.6	6231.9	0.3

[1] Feet above confluence with Leyden Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
(And Incorporated Areas)

FLOODWAY DATA

BARBARA GULCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BARBARA GULCH SPILL FLOW								
A	538	16	10	4.3	6079.3	6079.3	6079.3	0.0
B	1180	25	31	4.5	6093.0	6093.0	6093.0	0.0

[1] Feet above Limit of Detailed Study

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO (And Incorporated Areas)

FLOODWAY DATA

BARBARA GULCH SPILL FLOW

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BEAR CREEK (at Lakewood)								
A	14,731 [1]	230/20 [2]	1,511	5.2	5,360.2	5,360.2	5,361.0	0.8
B	15,021 [1]	194/34 [2]	961	8.2	5,360.6	5,360.6	5,361.4	0.8
C	15,371 [1]	140 [3]	964	8.2	5,363.3	5,363.3	5,364.0	0.7
D	15,951 [1]	110 [3]	796	9.9	5,367.4	5,367.4	5,367.4	0.0
E	16,391 [1]	82/42 [2]	673	11.8	5,371.2	5,371.2	5,371.2	0.0
F	16,801 [1]	230/100 [2]	1,618	4.9	5,374.5	5,374.5	5,375.3	0.8
G	17,116 [1]	112/22 [2]	1,028	7.7	5,375.1	5,375.1	5,375.7	0.6
H	17,476 [1]	80 [3]	589	13.4	5,376.3	5,376.3	5,376.4	0.1
I	18,141 [1]	99 [3]	950	8.3	5,381.5	5,381.5	5,382.1	0.6
J	18,581 [1]	85 [3]	713	11.1	5,382.4	5,382.4	5,382.9	0.5
BEAR CREEK (at Morrison)								
AW	55,995 [4]	390	1,990	7.0	5,755.0	5,755.0	5,755.0	0.0
AX	56,145 [4]	310	1,727	8.1	5,758.9	5,758.9	5,758.9	0.0
AY	56,610 [4]	229	1,032	13.6	5,765.2	5,765.2	5,765.2	0.0
AZ	57,105 [4]	220	1,456	9.3	5,775.7	5,775.7	5,775.7	0.0
BA	57,535 [4]	170	1,204	11.2	5,783.7	5,783.7	5,783.7	0.0
BB	57,780 [4]	273	1,440	9.4	5,790.7	5,790.7	5,790.7	0.0
BC	58,500 [4]	250	1,388	9.7	5,801.1	5,801.1	5,801.1	0.0
BD	58,870 [4]	276	1,549	8.7	5,807.6	5,807.6	5,807.6	0.0

[1] Feet above South Federal Boulevard (State Highway 88)
[2] Width/width within Jefferson County
[3] Width falls entirely outside Jefferson County
[4] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Bear Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BEAR CREEK TRIBUTARY NO. 7								
A	212	30	84	3.8	5,791.2	5,791.2 [2]	5,791.2 [2]	0.0
B	512	53	83	3.9	5,808.2	5,808.2	5,808.2	0.0
C	977	26	119	2.7	5,822.4	5,822.4	5,822.4	0.0

[1] Feet above mouth
[2] Elevation computed without consideration of backwater from Bear Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Bear Creek Tributary 7

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BIG DRY CREEK								
A	100,627	344	2,791	3.5	5165.6	5165.6	5165.7	0.1
B	103,231	195	1,306	7.1	5168.1	5168.1	5168.1	0.0
C	105,380	650	1,791	5.2	5173.2	5173.2	5173.6	0.4
D	107,616	956	1,642	5.6	5185.3	5185.3	5185.3	0.0
E	109,647	1,200	5,479	1.7	5190.8	5190.8	5191.1	0.3
F	111,952	428	2,161	4.2	5195.5	5195.5	5196.0	0.5
G	114,209	484[2]	3,222	2.8	5200.0	5200.0	5200.5	0.5
H	118,764	267	1,923	4.7	5206.6	5206.6	5207.0	0.4
I	124,267	485	2,691	3.0	5221.5	5221.5	5221.5	0.0
J	126,870	116	916	8.1	5222.0	5222.0	5222.2	0.2
K	128,892	270	1,515	4.8	5232.4	5232.4	5232.8	0.4
L	132,165	205	1,351	5.2	5241.6	5241.6	5241.6	0.0
M	137,041	255	1,938	3.5	5252.8	5252.8	5252.9	0.1
N	140,729	174	1,157	5.7	5262.4	5262.4	5262.4	0.0
O	144,298	274	1,624	3.9	5275.3	5275.3	5275.6	0.3
P	146,820	139	1,085	5.2	5284.4	5284.4	5284.6	0.2
Q	150,597	102	621	9.0	5294.2	5294.2	5294.3	0.1
R	153,124	192	1,384	2.0	5308.6	5308.6	5308.7	0.1
S	157,589	167	542	4.2	5319.6	5319.6	5320.0	0.4
T	161,001	377	383	5.9	5335.9	5335.9	5336.2	0.3
U	164,930	143	241	7.6	5363.0	5363.0	5363.0	0.0
V	168,039	101	351	5.2	5380.0	5380.0	5380.0	0.0
W	171,202	164	669	2.2	5392.8	5392.8	5392.8	0.0

[1] Feet above confluence with South Platte River

[2] Width extends beyond county boundary

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO

AND INCORPORATED AREAS

FLOODWAY DATA

Big Dry Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CITY PARK CHANNEL								
A	1,068	69	264	4.0	5,247.6	5,247.6	5,247.6	0.0
B	1,288	53	148	7.7	5,247.8	5,247.8	5,247.8	0.0
C	1,428	56	179	6.1	5,248.9	5,248.9	5,248.9	0.0
D	1,828	55	176	6.4	5,251.8	5,251.8	5,251.8	0.0
E	2,340	49	120	9.4	5,256.8	5,256.8	5,256.8	0.0
F	2,840	48	119	9.3	5,263.6	5,263.6	5,263.6	0.0
G	3,397	56	191	7.8	5,272.6	5,272.6	5,272.6	0.0
H	3,800	65	264	5.6	5,275.8	5,275.8	5,275.8	0.0
I	4,200	66	280	5.3	5,277.7	5,277.7	5,277.7	0.0
J	4,350	74	337	4.4	5,279.5	5,279.5	5,279.5	0.0
K	4,788	66	243	6.1	5,281.5	5,281.5	5,281.5	0.0

[1] Feet above confluence with Nissen Reservoir Basin

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

City Park Channel

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CLEAR CREEK								
A	34,470	1589	10142	2.0	5263.4	5263.4	5263.4	0.0
B	35,153	499	4374	3.3	5263.6	5263.6	5263.7	0.1
C	37,055	114	1235	11.8	5265.1	5265.1	5265.6	0.5
D	38,099	250	2010	8.1	5273.2	5273.2	5273.3	0.1
E	41,127	144	1729	8.5	5291.8	5291.8	5291.9	0.1
F	41,925	124	1760	8.3	5296.8	5296.8	5296.9	0.1
G	42,269	124	1597	9.1	5297.2	5297.2	5297.5	0.3
H	42,758	163	2103	6.9	5299.5	5299.5	5299.7	0.2
I	42,942	218	2483	6.3	5300.4	5300.4	5300.8	0.4
J	44,910	157	1530	9.8	5313.9	5313.9	5313.9	0.0
K	48,246	836	5772	2.5	5331.5	5331.5	5332.2	0.7
L	50,207	249	2212	6.6	5341.9	5341.9	5342.4	0.5
M	53,811	818	4205	0.0	5357.8	5357.8	5357.8	0.0
N	55,156	583	2895	4.7	5366.5	5366.5	5367.3	0.8
O	57,243	854	2774	5.0	5378.6	5378.6	5378.6	0.0
P	60,222	840	3783	3.6	5403.6	5403.6	5403.6	0.0
Q	63,524	880	6573	2.1	5424.0	5424.0	5424.0	0.0
R	65,315	138	1121	12.0	5433.5	5433.5	5433.5	0.0
S	68,301	149	1736	7.8	5474.5	5474.5	5474.5	0.0
T	70,502	180	1589	13.2	5493.5	5493.5	5493.5	0.0
U	73,870	104	1017	13.0	5527.9	5527.9	5527.9	0.0
V	74,356	172	1321	10.2	5532.6	5532.6	5532.6	0.0
W	78,508	137	1251	10.8	5565.2	5565.2	5565.2	0.0
X	80,413	124	915	14.7	5586.4	5586.4	5586.4	0.0
Y	82,310	103	761	17.7	5602.8	5602.8	5602.8	0.0
Z	83,744	256	2381	7.3	5615.5	5615.5	5615.5	0.0

[1] Feet above confluence with South Platte River

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Clear Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CLEAR CREEK (cont'd)								
AA	85,789	230	1552	8.7	5634.6	5634.6	5634.7	0.1
AB	87,237	453	2241	6.0	5642.8	5642.8	5642.8	0.0
AC	88,266	198	1187	11.4	5652.6	5652.6	5652.6	0.0
AD	88,941	135	1413	8.8	5661.8	5661.8	5662.4	0.6
AE	89,755	163	1050	11.8	5667.4	5667.4	5667.4	0.0
AF	90,791	408	1851	6.7	5672.8	5672.8	5673.0	0.2
AG	92,078	490	2006	9.4	5685.3	5685.3	5685.6	0.3
AH	93,958	243	2582	4.8	5707.0	5707.0	5707.1	0.1
AI	95,754	226	1228	10.1	5722.8	5722.8	5722.8	0.0
CLEAR CREEK RIGHT BANK OVERFLOW								
A	566 [2]	117	1,319	4.1	5,439.0	5,439.0	5,439.8	0.8
B	1,360 [2]	89	1,132	1.7	5,439.6	5,439.6	5,440.5	0.9

[1] Feet above confluence with South Platte River

[2] Feet above confluence with Clear Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Clear Creek – Clear Creek Right Bank Overflow

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
COON CREEK								
A [2]	100	94	452	6.5	5398.9	5398.9	5399.1	0.2
B [2]	882	101	497	6.0	5407.3	5407.3	5407.9	0.6
C	1,276	137	608	4.9	5413.2	5413.2	5414.2	1.0
D	2,311	74	375	7.9	5423.9	5423.9	5424.7	0.8
E	3,785	138	735	4.0	5438.8	5438.8	5439.8	1.0
F	5,530	95	331	8.5	5452.4	5452.4	5452.7	0.3
G	6,547	63	361	7.7	5464.4	5464.4	5465.0	0.6
H	7,317	367	1640	1.6	5473.1	5473.1	5473.3	0.2
I	8,127	103	451	5.8	5480.6	5480.6	5481.5	0.9
J	9,648	144	510	5.2	5496.2	5496.2	5497.2	1.0
K	10,179	150	582	4.5	5503.0	5503.0	5503.9	0.9
L	11,595	276	1347	2.0	5521.6	5521.6	5521.8	0.2
M	12,497	122	614	3.5	5524.5	5524.5	5525.1	0.6
N	13,650	178	1091	2.0	5538.1	5538.1	5539.1	1.0
O [2]	14,514	160	1064	2.0	5550.4	5550.4	5550.4	0.0
P [2]	15,155	87	334	6.4	5559.5	5559.5	5559.5	0.0
Q [2]	15,673	82	332	6.4	5564.9	5564.9	5565.0	0.1
R [2]	16,795	81	321	6.3	5572.1	5572.1	5572.3	0.2
S	17,911	114	555	2.8	5589.8	5589.8	5589.8	0.0
T	18,806	78	218	7.0	5600.7	5600.7	5600.8	0.1
U	20,465	65	155	8.1	5618.2	5618.2	5618.3	0.1
V	21,342	62	240	1.7	5631.3	5631.3	5631.3	0.0
W	22,294	60	74	5.6	5643.2	5643.2	5643.3	0.1
X	24,265	34	192	2.2	5677.6	5677.6	5677.6	0.0
Y	25,188	55	67	6.3	5705.7	5705.7	5705.7	0.0
Z	26,893	39	97	9.0	5714.5	5714.5	5714.6	0.1

[1] Stream distance in feet above confluence with Dutch Creek

[2] Cross sections existing in Arapahoe County shown here for information only

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Coon Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
COON CREEK (cont'd)								
AA	27,902 [1]	142	1,086	0.2	5738.5	5738.5	5739.5	1.0
AB	29,313 [1]	225	2,108	0.1	5770.4	5770.4	5770.5	0.1
AC	30,550 [1]	164	1,275	0.5	5791.1	5791.1	5791.2	0.1
AD	31,882 [1]	34	90	9.0	5805.4	5805.4	5805.4	0.0

[1] Stream distance in feet above confluence with Dutch Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Coon Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
COON CREEK NORTH BRANCH								
A	246	58	142	4.4	5621.5	5621.5	5621.5	0.0
B	1,046	48	149	4.2	5638.6	5638.6	5639.1	0.5
C	2,229	55	944	0.7	5675.4	5675.4	5676.3	0.9
D	3,545	36	103	6.1	5689.4	5689.4	5690.2	0.8
E	4,280	302	712	2.8	5705.9	5705.9	5705.9	0.0
F	5,390	82	102	5.8	5722.2	5722.2	5722.2	0.0
G	6,515	71	240	2.5	5741.5	5741.5	5741.5	0.0
H	7,678	49	147	2.2	5758.9	5758.9	5759.1	0.2
I	8,816	41	81	4.0	5772.5	5772.5	5772.5	0.0

[1] Stream distance in feet above confluence with Coon Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Coon Creek North Branch

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
COUNTRYSIDE CREEK								
A	140	20	124	6.8	5,353.3	5,353.3	5,353.3	0.0
B	510	53	123	6.8	5,356.2	5,356.2	5,356.2	0.0
C	1,800	104	335	2.5	5,364.2	5,364.2	5,364.2	0.0
D	2,745	30	104	7.2	5,372.8	5,372.8	5,372.8	0.0
E	4,310	56	136	5.5	5,393.5	5,393.5	5,393.5	0.0
F	4,860	51	92	7.2	5,403.8	5,403.8	5,404.1	0.3
G	5,590	141	196	3.4	5,413.1	5,413.1	5,413.2	0.1
H	6,510	202	191	3.5	5,423.3	5,423.3	5,423.3	0.0
I	7,340	48	128	4.9	5,431.7	5,431.7	5,431.7	0.0

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Countryside Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
DUTCH CREEK								
A [2]	300	134	839	8.9	5331.5	5331.5	5331.7	0.2
B [2]	1,111	146	888	8.4	5336.8	5336.8	5336.9	0.1
C [2]	2,508	150	1009	7.4	5349.9	5349.9	5350.0	0.1
D [2]	3,699	232	2283	3.3	5364.0	5364.0	5364.4	0.4
E [2]	4,573	159	1218	6.1	5364.9	5364.9	5365.2	0.3
F [2]	5,928	265	1389	5.3	5380.5	5380.5	5380.5	0.0
G [2]	7,898	151	709	10.3	5388.3	5388.3	5388.5	0.2
H [2]	9,697	151	747	9.8	5400.2	5400.2	5400.3	0.1
I	12,382	91	626	7.0	5424.3	5424.3	5424.5	0.2
J	13,785	124	474	9.2	5438.8	5438.8	5438.9	0.1
K	15,181	143	439	6.6	5450.2	5450.2	5450.9	0.7
L	16,480	509	2766	1.0	5463.9	5463.9	5463.9	0.0
M	19,863	181	435	6.5	5487.2	5487.2	5487.4	0.2
N	21,280	68	306	9.0	5501.9	5501.9	5501.9	0.0
O	23,573	204	1124	2.4	5523.4	5523.4	5523.4	0.0
P	24,278	218	2346	1.2	5540.0	5540.0	5540.0	0.0
Q	26,578	99	274	9.3	5554.2	5554.2	5554.2	0.0
R	27,676	154	414	6.2	5565.6	5565.6	5565.7	0.1
S	30,576	93	281	8.7	5597.8	5597.8	5598.0	0.2
T	31,577	86	296	7.4	5607.6	5607.6	5608.0	0.4
U	32,626	221	428	5.1	5621.1	5621.1	5621.8	0.7
V	34,768	257	1389	1.3	5661.0	5661.0	5662.0	1.0
W	36,295	45	159	9.9	5671.0	5671.0	5671.1	0.1
X	38,227	536	3335	0.5	5713.2	5713.2	5713.9	0.7
Y	39,506	47	147	9.7	5727.1	5727.1	5727.1	0.0
Z	40,167	38	134	10.6	5739.1	5739.1	5739.1	0.0

[1] Stream distance in feet above confluence with South Platte River

[2] Cross sections existing in Arapahoe County shown here for information only

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Dutch Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
DUTCH CREEK (cont'd)								
AA	41,566	35	204	7.0	5775.2	5775.2	5775.2	0.0
AB	44,768	42	131	9.6	5842.4	5842.4	5842.5	0.1
AC	46,922	62	162	7.7	5899.5	5899.5	5899.6	0.1
AD	48,165	27	118	10.6	5945.2	5945.2	5945.4	0.2
AE	49,165	30	114	10.6	5975.7	5975.7	5975.8	0.1

[1] Stream distance in feet above confluence with South Platte River

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Dutch Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE [1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
DUTCH CREEK TRIBUTARY								
A	623	39	151	1.3	5632.0	5632.0	5632.0	0.0
B	1,627	23	34	6.0	5660.2	5660.2	5660.4	0.2
C	2,327	33	34	5.8	5679.6	5679.6	5679.6	0.0
D	3,300	194	2,639	0.3	5726.7	5726.7	5726.7	0.0
E	4,580	44	51	6.1	5762.3	5762.3	5762.3	0.0
F	5,586	32	45	6.8	5810.0	5810.0	5810.0	0.0

[1] Stream distance in feet above confluence with Dutch Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Dutch Creek Tributary

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
JACKSON GULCH								
A	345	130	99	2.9	6,123.7	6,123.7	6,123.7	0.0
B	820	210	36	8.1	6,135.9	6,135.9	6,135.9	0.0
C	1,125	60	103	10.0	6,151.9	6,151.9	6,151.9	0.0
D	1,530	65	102	10.1	6,163.4	6,163.4	6,163.4	0.0

[1] Feet above confluence with Lena Gulch

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Jackson Gulch

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
LENA GULCH								
A	531	64	423	7.2	5367.1	5367.1	5367.1	0.0
B	718	97	738	3.8	5371.8	5371.8	5371.8	0.0
C	1,707	110	647	3.6	5381.5	5381.5	5381.5	0.0
D	2,154	29	293	7.6	5385.3	5385.3	5385.3	0.0
E	2,722	45	241	9.0	5391.3	5391.3	5391.3	0.0
F	3,399	94	439	5.0	5397.3	5397.3	5397.3	0.0
G	4,482	44	319	6.8	5408.1	5408.1	5408.1	0.0
H	5,380	112	286	6.8	5416.2	5416.2	5416.2	0.0
I	6,417	150	285	6.8	5427.9	5427.9	5428.3	0.4
J	7,446	173	325	5.9	5438.6	5438.6	5438.8	0.2
K	8,198	280	469	4.1	5443.5	5443.5	5443.9	0.4
L	9,025	85	210	9.1	5452.5	5452.5	5452.5	0.0
M	9,845	85	309	6.6	5463.4	5463.4	5463.4	0.0
N	10,576	46	175	11.0	5470.8	5470.8	5470.8	0.0
O	11,226	52	221	8.7	5478.4	5478.4	5478.4	0.0
P	11,810	45	173	11.1	5488.5	5488.5	5488.5	0.0
BX	37,005	58	193	11.4	5927.6	5927.6	5927.6	0.0
BY	37,189	29	158	13.3	5934.8	5934.8	5934.8	0.0
BZ	37,544	34	168	12.5	5942.7	5942.7	5942.7	0.0
CA	38,792	62	209	10.1	5974.0	5974.0	5975.0	1.0
CB	39,479	93	236	8.9	5994.3	5994.3	5994.3	0.0
CC	39,935	80	195	8.5	6009.8	6009.8	6009.9	0.1
CD	40,580	79	217	8.8	6037.4	6037.4	6037.4	0.0
CE	41,000	22	135	14.1	6053.7	6053.7	6053.7	0.0

[1] Stream distance in feet above confluence with Clear Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Lena Gulch

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
LEYDEN CREEK								
A	350	115	444	5.5	5,423.8	5,423.8	5,423.8	0.0
B	969	97	346	7.1	5,427.8	5,427.8	5,427.8	0.0
C	1,198	94	383	6.4	5,428.8	5,428.8	5,428.8	0.0
D	1,540	69	254	9.7	5,432.8	5,432.8	5,433.1	0.3
E	1,933	169	420	5.9	5,437.4	5,437.4	5,438.1	0.7
F	2,233	96	312	7.9	5,439.4	5,439.4	5,439.6	0.2
G	3,043	87	353	6.2	5,444.0	5,444.0	5,444.8	0.8
H	3,523	117	352	6.2	5,449.0	5,449.0	5,449.4	0.4
I	4,183	76	896	2.5	5,450.0	5,450.0	5,451.0	1.0
J	4,643	155	200	7.6	5,454.8	5,454.8	5,455.5	0.7
K	5,193	59	163	9.4	5,460.8	5,460.8	5,460.9	0.1
L	5,653	77	262	4.0	5,463.1	5,463.1	5,463.6	0.5
M	6,153	67	132	7.9	5,465.4	5,465.4	5,465.4	0.0
N	7,513	251	376	2.8	5,474.2	5,474.2	5,474.8	0.6
O	8,533	68	123	8.4	5,485.5	5,485.5	5,485.8	0.3
P	8,613	57	221	4.7	5,486.3	5,486.3	5,487.0	0.7
Q	8,983	128	264	3.9	5,488.0	5,488.0	5,488.2	0.2
R	10,043	71	49	7.6	5,495.6	5,495.6	5,496.0	0.4
S	10,273	28	63	5.9	5,497.9	5,497.9	5,498.2	0.3
T	11,543	28	59	6.3	5,504.3	5,504.3	5,504.3	0.0
U	11,893	20	44	8.5	5,508.5	5,508.5	5,508.6	0.1
V	12,283	26	67	5.6	5,511.7	5,511.7	5,511.9	0.2
W	12,973	56	51	7.3	5,518.1	5,518.1	5,518.7	0.6
X	13,443	28	61	6.1	5,522.4	5,522.4	5,523.0	0.6
Y	13,913	28	49	7.6	5,530.8	5,530.8	5,531.3	0.5
Z	14,373	61	66	5.7	5,536.9	5,536.9	5,537.5	0.6

[1] Feet above confluence with Ralston Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Leyden Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
LEYDEN CREEK (cont'd)								
AA	14,973	30	70	5.3	5,541.4	5,541.4	5,541.7	0.3
AB	15,503	64	55	6.8	5,546.4	5,546.4	5,546.9	0.5
AC	15,873	40	56	6.6	5,551.5	5,551.5	5,551.6	0.1
AD	16,839	36	84	4.4	5,564.1	5,564.1	5,565.0	0.9

[1] Feet above confluence with Ralston Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Leyden Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
LEYDEN CREEK								
AE	21,273	136	587	5.5	5,616.6	5,616.6	5,616.6	0.0
AF	21,822	155	1,737	1.9	5,631.1	5,631.1	5,631.4	0.3
AG	22,610	116	725	4.5	5,631.8	5,631.8	5,632.2	0.4
AH	23,142	82	465	7.0	5,637.4	5,637.4	5,637.9	0.5
AI	23,623	167	828	3.9	5,648.0	5,648.0	5,648.4	0.4
AJ	24,147	133	886	3.7	5,650.1	5,650.1	5,650.6	0.5
AK	24,627	86	365	8.9	5,652.3	5,652.3	5,652.8	0.5
AL	25,094	66	378	8.6	5,659.2	5,659.2	5,659.4	0.2
AM	25,573	93	407	5.5	5,663.3	5,663.3	5,663.6	0.3
AN	25,983	96	339	6.7	5,666.8	5,666.8	5,667.3	0.5
AO	26,581	102	358	6.3	5,675.6	5,675.6	5,676.0	0.4
AP	27,202	35	175	11.6	5,684.5	5,684.5	5,685.0	0.5
AQ	27,712	50	325	6.2	5,693.9	5,693.9	5,694.1	0.2
AR	28,242	128	401	5.0	5,697.7	5,697.7	5,698.2	0.5
AS	28,871	60	196	10.3	5,702.6	5,702.6	5,703.0	0.4
AT	29,243	53	252	8.0	5,708.6	5,708.6	5,709.0	0.4
AU	29,893	61	297	6.8	5,716.3	5,716.3	5,716.8	0.5
AV	30,447	64	322	6.3	5,722.9	5,722.9	5,723.4	0.5
AW	31,088	74	355	5.7	5,730.7	5,730.7	5,731.2	0.5
AX	31,499	42	187	10.0	5,735.4	5,735.4	5,735.9	0.5
AY	32,105	76	204	9.2	5,744.9	5,744.9	5,744.9	0.0
AZ	32,711	45	228	8.2	5,755.1	5,755.1	5,755.5	0.4
BA	33,433	191	306	6.1	5,766.5	5,766.5	5,766.9	0.4
BB	33,947	87	276	6.8	5,773.4	5,773.4	5,773.9	0.5
BC	34,424	47	177	10.6	5,779.0	5,779.0	5,779.1	0.1
BD	35,140	39	160	11.7	5,787.8	5,787.8	5,788.0	0.2
BE	35,623	32	152	12.3	5,795.1	5,795.1	5,795.2	0.1
BF	36,332	46	172	10.9	5,804.9	5,804.9	5,804.9	0.0
BG	36,656	150	456	4.1	5,808.2	5,808.2	5,808.7	0.5

[1] Stream Distance In Feet Above Mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
(And Incorporated Areas)

FLOODWAY DATA

LEYDEN CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
LEYDEN CREEK								
BH	37,149	220	896	2.1	5,815.7	5,815.7	5,816.1	0.4
BI	37,604	50	180	10.4	5,818.3	5,818.3	5,818.7	0.4
BJ	38,217	64	163	9.1	5,829.7	5,829.7	5,830.0	0.3
BK	38,737	175	588	2.5	5,839.5	5,839.5	5,839.8	0.3
BL	39,420	143	275	5.4	5,852.8	5,852.8	5,853.0	0.2
BM	40,149	150	316	4.7	5,864.3	5,864.3	5,864.8	0.5
BN	40,777	140	280	5.3	5,879.0	5,879.0	5,879.5	0.5
BO	41,324	90	182	8.1	5,896.5	5,896.5	5,896.6	0.1
BP	41,744	35	135	11.0	5,899.6	5,899.6	5,899.8	0.2
BQ	42,180	52	165	15.2	5,923.2	5,923.2	5,923.2	0.0

[1] Stream Distance In Feet Above Mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
(And Incorporated Areas)

FLOODWAY DATA

LEYDEN CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
LILLEY GULCH								
A	103	198	616	3.1	5442.1	5442.1	5442.4	0.3
B	1,200	124	271	7.1	5455.8	5455.8	5455.9	0.1
C	2,367	118	630	2.8	5477.5	5477.5	5477.7	0.2
D	3,612	102	236	7.6	5486.5	5486.5	5486.5	0.0
E	5,167	41	160	11.1	5506.1	5506.1	5506.1	0.0
F	6,232	122	360	4.9	5518.8	5518.8	5518.8	0.0
G	6,863	99	606	2.9	5528.3	5528.3	5528.7	0.4
H	8,253	649	4065	0.4	5552.3	5552.3	5553.1	0.8
I	9,107	104	442	3.8	5552.9	5552.9	5553.4	0.5
J	9,777	211	916	1.8	5569.3	5569.3	5569.7	0.4
K	11,778	37	147	10.0	5591.0	5591.0	5591.0	0.0
L	13,951	71	173	7.4	5628.1	5628.1	5628.1	0.0
M	16,296	54	151	8.4	5683.5	5683.5	5683.5	0.0
N	17,854	136	152	6.0	5716.9	5716.9	5716.9	0.0
O	19,224	44	104	8.7	5748.9	5748.9	5748.9	0.0
P	20,482	103	233	3.9	5768.0	5768.0	5768.1	0.1
Q	21,174	72	222	2.7	5780.5	5780.5	5780.6	0.1
R	22,871	540	1987	0.2	5817.2	5817.2	5817.2	0.0
S	23,831	122	92	3.9	5829.1	5829.1	5829.1	0.0

[1] Stream distance in feet above confluence with Dutch Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Lilley Gulch

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
NORTH BRANCH LILLEY GULCH								
A	153	35	87	1.4	5496.1	5496.1	5496.1	0.0
B	688	41	30	3.9	5516.2	5516.2	5516.2	0.0
C	1,802	103	90	1.3	5527.4	5527.4	5527.4	0.0
D	4,211	525	732	2.1	5533.9	5533.9	5533.9	0.0
E	4,833	50	328	1.8	5538.5	5538.5	5538.8	0.3
F	5,387	175	669	0.9	5548.1	5548.1	5548.1	0.0
G	6,251	66	158	3.8	5559.7	5559.7	5559.7	0.0
H	7,251	26	56	4.9	5572.4	5572.4	5572.5	0.1
I	7,817	36	109	2.5	5581.0	5581.0	5581.0	0.0
J	8,253	87	178	1.5	5586.7	5586.7	5586.7	0.0
K	9,084	33	190	1.4	5604.7	5604.7	5605.2	0.5
L	10,089	18	41	6.6	5628.2	5628.2	5628.2	0.0

[1] Stream distance in feet above confluence with Lilley Gulch

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

North Branch Lilley Gulch

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
LITTLE DRY CREEK TRIBUTARY B								
A	1,330	139	502	1.7	5,458.7	5,458.7	5,459.7	1.0
B	1,520	46	114	7.5	5,459.0	5,459.0	5,459.4	0.4
C	1,600	44	106	8.0	5,459.3	5,459.3	5,459.5	0.2
D	1,690	77	348	2.4	5,463.2	5,463.2	5,463.9	0.7
E	2,285	53	137	5.1	5,466.0	5,466.0	5,466.0	0.0
F	2,600	65	165	4.2	5,468.9	5,468.9	5,468.9	0.0
G	2,795	126	700	1.0	5,474.3	5,474.3	5,474.3	0.0
H	3,385	50	102	5.4	5,477.8	5,477.8	5,477.8	0.0
I	4,075	63	134	4.1	5,484.3	5,484.3	5,484.3	0.0

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Little Dry Creek Tributary B

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MASSEY DRAW								
A	131	157	481	7.9	5,460.3	5,460.3	5,460.3	0.0
B	561	106	536	7.1	5,465.9	5,465.9	5,465.9	0.0
C	1,213	76	334	11.4	5,468.2	5,468.2	5,468.2	0.0
D	1,392	726	7,016	0.5	5,481.2	5,481.2	5,481.2	0.0
E	3,747	197	504	7.5	5,504.3	5,504.3	5,504.3	0.0
F	4,135	126	342	8.9	5,510.1	5,510.1	5,510.1	0.0
G	4,732	103	1,024	3.0	5,528.3	5,528.3	5,528.3	0.0
H	5,550	46	230	12.8	5,530.1	5,530.1	5,530.1	0.0
I	6,300	44	227	12.9	5,539.3	5,539.3	5,539.5	0.2
J	6,923	40	227	13.0	5,550.3	5,550.3	5,550.4	0.1
K	7,611	70	313	9.4	5,561.0	5,561.0	5,561.0	0.0
L	8,243	463	3,440	0.8	5,571.4	5,571.4	5,572.1	0.7
M	8,606	95	300	9.4	5,581.2	5,581.2	5,581.2	0.0
N	9,233	129	441	6.4	5,586.9	5,586.9	5,586.9	0.0
O	9,912	110	324	8.7	5,598.2	5,598.2	5,598.2	0.0
P	10,509	91	330	8.6	5,601.9	5,601.9	5,601.9	0.0
Q	11,033	132	1,401	2.4	5,618.2	5,618.2	5,618.6	0.4
R	11,760	60	306	9.0	5,618.3	5,618.3	5,618.9	0.6
S	12,522	98	330	8.3	5,635.1	5,635.1	5,635.5	0.4
T	13,548	64	255	10.8	5,653.9	5,653.9	5,653.9	0.0
U	14,396	296	296	3.8	5,664.5	5,664.5	5,664.5	0.0
V	15,145	245	484	5.4	5,673.3	5,673.3	5,673.3	0.0
W	15,994	270	591	4.5	5,682.7	5,682.7	5,682.7	0.0
X	16,525	173	217	6.4	5,689.0	5,689.0	5,689.0	0.0
Y	17,099	406	381	3.7	5,696.2	5,696.2	5,696.2	0.0
Z	17,779	248	313	4.4	5,707.3	5,707.3	5,707.3	0.0

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Massey Draw

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MASSEY DRAW (cont'd)								
AA	18,497	216	234	5.9	5,716.2	5,716.2	5,716.2	0.0
AB	18,992	156	216	6.4	5,726.1	5,726.1	5,726.1	0.0
AC	19,483	256	1,021	5.8	5,734.4	5,734.4	5,734.4	0.0
AD	19,818	160	303	6.0	5,745.0	5,745.0	5,745.0	0.0
AE	20,357	167	313	5.8	5,748.2	5,748.2	5,748.2	0.0
AF	21,114	118	266	8.5	5,754.8	5,754.8	5,754.8	0.0
AG	21,616	56	207	10.9	5,765.2	5,765.2	5,765.2	0.0
AH	22,287	126	426	4.9	5,771.4	5,771.4	5,771.4	0.0
AI	23,034	102	268	7.8	5,782.9	5,782.9	5,782.9	0.0
AJ	23,780	88	234	8.8	5,793.0	5,793.0	5,793.0	0.0
AK	24,382	50	186	11.1	5,807.9	5,807.9	5,807.9	0.0
AL	25,129	49	246	8.4	5,822.1	5,822.1	5,822.1	0.0
AM	25,625	55	190	10.9	5,834.0	5,834.0	5,834.0	0.0
AN	26,586	46	182	11.0	5,870.2	5,870.2	5,870.2	0.0
AO	27,095	30	154	12.9	5,889.4	5,889.4	5,889.4	0.0
AP	27,597	54	245	8.1	5,895.6	5,895.6	5,896.4	0.8
MASSEY DRAW RIGHT BANK SPLIT FLOW								
A	162 [2]	92	214	2.0	5735.8	5735.8	5735.8	0.0
B	1,074 [2]	68	76	5.6	5747.8	5747.8	5747.8	0.0

[1] Feet above mouth
[2] Feet above confluence with Massey Draw

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Massey Draw – Massey Draw Right Bank Split Flow

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MASSEY DRAW TRIBUTARY								
A	213	78	225	5.3	5,507.0	5,507.0	5,507.0	0.0
B	990	294	762	2.5	5,531.1	5,531.1	5,531.1	0.0
C	1,502	35	105	9.9	5,532.6	5,532.6	5,532.6	0.0
D	2,088	43	132	7.9	5,546.2	5,546.2	5,546.2	0.0
E	2,522	44	140	7.4	5,551.1	5,551.1	5,551.1	0.0
F	2,937	30	133	7.8	5,560.3	5,560.3	5,560.3	0.0
G	4,623	24	117	9.3	5,589.1	5,589.1	5,589.1	0.0
H	5,109	15	147	11.2	5,600.1	5,600.1	5,600.1	0.0
I	5,427	90	218	2.5	5,603.9	5,603.9	5,604.7	0.8
J	5,879	178	157	3.5	5,611.3	5,611.3	5,611.3	0.0
K	6,477	164	139	3.9	5,619.5	5,619.5	5,619.5	0.0
L	6,994	47	97	5.7	5,628.9	5,628.9	5,628.9	0.0
M	7,838	34	55	7.2	5,643.1	5,643.1	5,643.1	0.0
N	8,764	32	78	5.0	5,655.3	5,655.3	5,655.3	0.0
O	9,369	57	193	2.0	5,679.3	5,679.3	5,679.3	0.0
P	10,115	118	84	4.7	5,698.1	5,698.1	5,698.1	0.0
Q	10,792	39	62	3.1	5,705.7	5,705.7	5,705.7	0.0
R	11,393	385	2,086	0.1	5,726.4	5,726.4	5,726.4	0.0
S	12,366	51	47	4.1	5,734.7	5,734.7	5,734.7	0.0
T	12,787	29	37	5.1	5,744.0	5,744.0	5,744.0	0.0

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Massey Draw Tributary

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MIDDLE BRANCH HYLANDS CREEK								
A	230	78	266	4.8	5,301.1	5,301.1	5,301.1	0.0
B	780	55	261	4.9	5,304.1	5,304.1	5,304.1	0.0
C	1,259	23	106	12.1	5,307.3	5,307.3	5,307.3	0.0
D	1,790	44	119	7.3	5,314.4	5,314.4	5,314.4	0.0
E	2,355	39	114	6.7	5,334.2	5,334.2	5,334.2	0.0
F	2,860	39	92	8.4	5,342.8	5,342.8	5,342.8	0.0
G	3,477	19	58	9.8	5,350.4	5,350.4	5,350.4	0.0
H	4,003	35	86	6.6	5,366.3	5,366.3	5,366.3	0.0
I	4,700	51	112	3.7	5,376.5	5,376.5	5,376.5	0.0
J	5,200	34	67	6.2	5,383.9	5,383.9	5,383.9	0.0
K	5,365	40	91	3.7	5,389.5	5,389.5	5,389.5	0.0
L	5,790	36	50	6.7	5,398.4	5,398.4	5,398.4	0.0
M	6,200	23	49	4.7	5,408.2	5,408.2	5,408.2	0.0
N	6,320	41	111	2.1	5,411.7	5,411.7	5,411.7	0.0
O	6,670	92	123	1.9	5,412.8	5,412.8	5,412.8	0.0
P	7,340	126	348	1.1	5,426.4	5,426.4	5,426.4	0.0
Q	7,500	77	116	2.2	5,434.7	5,434.7	5,434.7	0.0
R	7,825	45	44	5.7	5,442.9	5,442.9	5,442.9	0.0
S	8,106	46	44	5.6	5,448.6	5,448.6	5,448.6	0.0
T	8,256	90	340	0.9	5,450.6	5,450.6	5,450.7	0.1
U	8,676	21	35	7.4	5,454.3	5,454.3	5,454.3	0.0
V	8,786	54	34	7.5	5,459.6	5,459.6	5,459.6	0.0
W	9,156	17	31	6.6	5,466.7	5,466.7	5,466.7	0.0

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Middle Branch Hylands Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MIDDLE BRANCH HYLANDS CREEK (cont'd)								
X	9,526	23	31	6.6	5,480.4	5,480.4	5,480.4	0.0
Y	9,706	13	3	1.5	5,487.1	5,487.1	5,487.1	0.0
Z	10,492	46	42	5.4	5,509.9	5,509.9	5,510.0	0.1
AA	10,921	38	10	2.8	5,526.5	5,526.5	5,526.5	0.0

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Middle Branch Hylands Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MIDDLE COTTON CREEK								
A	700	22	35	7.3	5,252.0	5,249.5	5,251.2	1.7
B	1,350	42	80	2.9	5,275.2	5,275.2	5,275.3	0.1
C	1,500	6	31	7.4	5,280.1	5,280.1	5,280.1	0.0
D	2,200	37	39	5.9	5,306.4	5,306.4	5,306.4	0.0
E	2,800	25	30	6.3	5,332.7	5,332.7	5,332.8	0.1
F	3,460	26	32	5.9	5,354.6	5,354.6	5,354.6	0.0
G	3,600	21	29	6.6	5,358.0	5,358.0	5,358.0	0.0
H	4,150	16	42	3.8	5,367.2	5,367.2	5,368.1	0.9
I	4,660	28	48	3.4	5,371.4	5,371.4	5,371.7	0.3
J	5,200	13	21	7.5	5,403.0	5,403.0	5,403.0	0.0

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Middle Cotton Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MOUNT VERNON CREEK								
A	170	300	1,420	3.1	5,771.4	5,771.4	5,771.4	0.0
B	370	100	547	8.0	5,778.8	5,778.8	5,778.8	0.0
C	775	80	482	9.1	5,790.2	5,790.2	5,790.2	0.0
D	1,100	73	446	9.9	5,798.5	5,798.5	5,798.8	0.3
E	1,595	58	324	13.6	5,813.3	5,813.3	5,813.3	0.0
F-AO [2]	-	-	-	-	-	-	-	-

[1] Feet above mouth
[2] Floodway not computed

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Mount Vernon Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
NISSEN RESERVOIR CHANNEL								
A	310	151	476	8.0	5,216.8	5,216.8	5,217.4	0.6
B	500	227	508	7.5	5,234.2	5,234.2	5,234.6	0.4
C	880	503	3,132	1.2	5,234.9	5,234.9	5,235.9	1.0
D	1,260	280	570	6.7	5,235.4	5,235.4	5,235.6	0.2
E	1,650	175	961	4.0	5,237.5	5,237.5	5,237.6	0.1
F	2,250	131	603	6.3	5,238.7	5,238.7	5,239.0	0.3
G	2,300	96	357	10.6	5,238.7	5,238.7	5,239.1	0.4

[1] Feet above confluence with Big Dry Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Nissen Reservoir Channel

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
NORTH BRANCH HYLANDS CREEK								
A	353	43	102	3.6	5,335.0	5,335.0	5,335.1	0.1
B	774	59	223	1.4	5,346.4	5,346.4	5,346.4	0.0
C	1,459	55	56	5.8	5,358.2	5,358.2	5,358.2	0.0
D	2,079	48	86	3.7	5,370.3	5,370.3	5,370.3	0.0
E	2,684	49	48	5.6	5,381.3	5,381.3	5,381.3	0.0
F	3,284	43	52	5.2	5,395.3	5,395.3	5,395.3	0.0
G	3,455	357	258	1.0	5,412.5	5,412.5	5,412.5	0.0
H	3,955	80	133	1.7	5,413.8	5,413.8	5,413.8	0.0
I	4,411	97	118	1.9	5,424.5	5,424.5	5,424.5	0.0
J	4,684	53	103	2.2	5,425.5	5,425.5	5,425.5	0.0
K	4,853	49	56	4.1	5,427.4	5,427.4	5,427.6	0.2
L	5,033	96	112	1.7	5,439.4	5,439.4	5,439.4	0.0
M	5,853	56	41	4.6	5,458.4	5,458.4	5,459.3	0.9

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

North Branch Hylands Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
NORTH BRANCH WALNUT CREEK								
A	360	40	79	6.6	5,438.1	5,438.1	5,438.7	0.6
B	1,790	29	98	5.3	5,453.2	5,453.2	5,454.0	0.8
C	3,320	22	69	7.5	5,469.7	5,469.7	5,470.4	0.7

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

North Branch Walnut Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
NORTH CITY PARK CREEK								
A	100	11	16	6.8	5,261.8	5,253.3 [2]	5,254.2	0.9
B	550	31	20	4.6	5,279.5	5,279.5	5,279.5	0.0
C	1,150	45	21	3.8	5,301.3	5,301.3	5,301.3	0.0

[1] Feet above mouth
[2] Elevations computed without consideration of backwater from Big Dry Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

North City Park Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
NORTH COTTON CREEK								
A	421	152	205	1.5	5,251.8	5,249.5[2]	5,249.5	0.0
B	654	42	50	6.1	5,251.8	5,250.1[2]	5,250.1	0.0
C	1,011	50	42	4.7	5,259.5	5,259.5	5,259.5	0.0
D	1,394	50	31	4.5	5,273.2	5,273.2	5,273.2	0.0
E	1,638	48	31	4.5	5,281.7	5,281.7	5,281.7	0.0
F	1,849	33	50	3.9	5,283.8	5,283.8	5,283.8	0.0
G	2,086	20	25	6.1	5,289.5	5,289.5	5,289.5	0.0
H	2,470	20	24	6.3	5,297.0	5,297.0	5,297.0	0.0
I	2,831	136	230	2.1	5,305.3	5,305.3	5,305.3	0.0
J	3,259	72	30	3.5	5,313.2	5,313.2	5,313.2	0.0
K	3,674	74	36	4.0	5,325.7	5,325.7	5,325.7	0.0

[1] Feet above confluence with Big Dry Creek
[2] Elevations computed without consideration of backwater from Big Dry Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

North Cotton Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
QUAIL CREEK								
A	1,183	85	278	4.5	5,168.9	5,168.9	5,168.9	0.0
B	1,518	77	231	5.4	5,169.9	5,169.9	5,169.9	0.0
C	1,866	101	274	4.6	5,171.1	5,171.1	5,171.1	0.0
D	2,389	111	301	3.6	5,173.1	5,173.1	5,173.1	0.0
E	2,806	65	307	3.6	5,179.0	5,179.0	5,179.0	0.0
F	3,306	51	202	5.4	5,179.5	5,179.5	5,179.5	0.0
G	3,994	75	298	3.4	5,186.3	5,186.3	5,186.6	0.3
H	4,274	72	213	4.8	5,186.7	5,186.7	5,186.9	0.2
I	4,832	65	180	5.7	5,188.7	5,188.7	5,188.9	0.2
J	5,471	85	370	2.4	5,194.0	5,194.0	5,194.7	0.7
K	6,256	135	309	2.8	5,194.8	5,194.8	5,195.1	0.3
L	6,942	137	238	3.7	5,198.6	5,198.6	5,198.6	0.0
M	7,436	21	95	11.0	5,202.0	5,202.0	5,202.0	0.0

[1] Feet above confluence with Big Dry Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Quail Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
RALSTON CREEK								
A	218	249	1,065	9.1	5,257.9	5,257.9	5,258.2	0.3
B	906	181	1,547	6.5	5,263.0	5,263.0	5,263.0	0.0
C	1,709	180	1,009	9.6	5,270.1	5,270.1	5,270.1	0.0
D	2,453	217	1,672	5.8	5,273.5	5,273.5	5,273.5	0.0
E	3,812	110	687	14.1	5,281.1	5,281.1	5,281.1	0.0
F	4,558	153	912	10.6	5,288.7	5,288.7	5,289.3	0.6
G	5,608	217	1,832	5.3	5,298.3	5,298.3	5,298.9	0.6
H	7,329	209	1,605	6.0	5,301.5	5,301.5	5,302.5	1.0
I	7,997	345	1,150	8.4	5,306.9	5,306.9	5,306.9	0.0
J	9,047	143	742	13.1	5,313.6	5,313.6	5,313.8	0.2
K	10,145	180	1,080	9.0	5,318.4	5,318.4	5,318.4	0.0
L	10,835	144	863	11.2	5,321.8	5,321.8	5,322.4	0.6
M	11,981	200	1,426	6.8	5,330.6	5,330.6	5,331.6	1.0
N	13,015	160	1,083	9.0	5,336.6	5,336.6	5,337.3	0.7
O	13,909	171	1,191	8.2	5,340.1	5,340.1	5,340.1	0.0
P	15,317	300	1,143	5.9	5,346.4	5,346.4	5,347.2	0.8
Q	16,448	115	704	9.7	5,351.6	5,351.6	5,351.7	0.1
R	17,693	445	1,213	5.6	5,359.7	5,359.7	5,359.9	0.2
S	18,430	588	1,290	5.3	5,364.6	5,364.6	5,364.6	0.0
T	19,823	538	1,010	6.7	5,372.7	5,372.7	5,373.4	0.7
U	20,972	593	1,634	4.2	5,380.5	5,380.5	5,381.4	0.9
V	22,675	202	659	10.3	5,389.8	5,389.8	5,389.9	0.1
W	23,534	175	931	7.3	5,391.8	5,391.8	5,392.7	0.9
X	24,808	178	737	9.2	5,403.5	5,403.5	5,403.8	0.3
Y	25,867	693	1,252	5.4	5,412.7	5,412.7	5,413.4	0.7
Z	26,632	237	692	9.8	5,418.3	5,418.3	5,418.5	0.2

[1] Feet above confluence with Clear Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Ralston Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
RALSTON CREEK (cont'd)								
AA	27,619	101	402	11.3	5,423.0	5,423.0	5,423.3	0.3
AB	28,753	103	545	8.3	5,431.4	5,431.4	5,431.9	0.5
AC	29,412	112	667	6.8	5,436.6	5,436.6	5,437.4	0.8
AD	30,387	374	748	6.0	5,447.1	5,447.1	5,447.8	0.7
AE	31,558	223	585	7.7	5,456.9	5,456.9	5,457.0	0.1
AF	33,131	124	616	7.3	5,468.1	5,468.1	5,468.7	0.6
AG	34,431	95	488	9.3	5,481.4	5,481.4	5,481.9	0.5
AH	35,792	166	570	7.7	5,492.5	5,492.5	5,492.9	0.4
AI	36,837	98	436	10.1	5,502.7	5,502.7	5,502.7	0.0
AJ	38,037	105	444	9.9	5,514.0	5,514.0	5,514.5	0.5
AK	38,783	150	702	6.3	5,519.6	5,519.6	5,520.1	0.5
AL	39,853	94	466	9.4	5,523.3	5,523.3	5,524.0	0.7
AM	41,565	300	816	5.4	5,535.1	5,535.1	5,535.5	0.4
AN	42,934	170	774	5.7	5,546.8	5,546.8	5,547.3	0.5
AO	43,704	131	530	8.3	5,556.6	5,556.6	5,556.9	0.3
AP	44,663	200	591	7.5	5,571.8	5,571.8	5,572.4	0.6
AQ	45,471	290	859	5.2	5,576.4	5,576.4	5,577.3	0.9
AR	46,545	90	387	11.5	5,588.1	5,588.1	5,588.3	0.2
AS	47,372	172	517	8.6	5,596.7	5,596.7	5,597.3	0.6
AT	49,635	122	469	9.5	5,622.7	5,622.7	5,622.9	0.2
AU	50,116	134	508	8.7	5,629.2	5,629.2	5,629.2	0.0
AV	50,958	256	490	9.1	5,639.1	5,639.1	5,639.9	0.8
AW	51,737	160	444	10.0	5,648.0	5,648.0	5,648.0	0.0
AX	52,584	370	1,562	2.8	5,664.5	5,664.5	5,665.5	1.0
AY	53,325	24	3	3.8	5,666.5	5,666.5	5,666.5	0.0

[1] Feet above confluence with Clear Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Ralston Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
RANCH CREEK								
A	300	281	1,012	2.2	5,213.1	5,210.2 [2]	5,211.2	1.0
B	1,000	60	260	8.5	5,222.2	5,222.2	5,223.2	1.0
C	1,390	85	268	8.2	5,229.7	5,229.7	5,229.7	0.0
D	1,470	85	375	5.9	5,230.8	5,230.8	5,231.0	0.2
E	1,620	100	977	2.3	5,240.4	5,240.4	5,240.4	0.0
F	2,200	77	513	4.3	5,241.7	5,241.7	5,242.0	0.3
G	2,500	236	2,354	0.9	5,252.4	5,252.4	5,252.8	0.4
H	3,230	96	567	3.5	5,253.0	5,253.0	5,253.4	0.4
I	3,760	41	231	8.7	5,256.5	5,256.5	5,257.1	0.6
J	4,670	222	300	6.7	5,296.0	5,296.0	5,296.0	0.0
K	4,710	645	495	4.0	5,304.0	5,304.0	5,304.1	0.1
L	4,750	680	8,528	0.2	5,304.3	5,304.3	5,304.3	0.0
M	5,380	332	2,532	0.5	5,304.6	5,304.6	5,304.6	0.0
N	6,290	111	345	3.0	5,304.4	5,304.4	5,304.4	0.0
O	6,480	94	166	6.3	5,307.1	5,307.1	5,307.5	0.4
P	7,160	52	116	7.7	5,318.4	5,318.4	5,318.9	0.5
Q	7,220	120	145	6.2	5,324.3	5,324.3	5,324.5	0.2
R	7,850	40	109	7.3	5,327.8	5,327.8	5,328.2	0.4
S	8,130	92	403	2.0	5,336.4	5,336.4	5,336.4	0.0
T	8,300	130	534	1.5	5,336.3	5,336.3	5,336.3	0.0
U	8,900	70	95	6.3	5,344.9	5,344.9	5,344.9	0.0
V	9,700	45	105	4.4	5,363.2	5,363.2	5,363.6	0.4
W	10,520	47	53	6.1	5,380.0	5,380.0	5,380.0	0.0
X	10,950	36	49	6.6	5,392.1	5,392.1	5,392.8	0.7

[1] Feet above mouth
[2] Elevation computed without consideration of backwater from Big Dry Creek

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Ranch Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SJCD 6200								
A	84	119	309	9.2	5,367.7	5,367.7	5,367.7	0.0
B	534	117	331	8.6	5,372.6	5,372.6	5,372.6	0.0
C	1,194	113	654	4.4	5,377.2	5,377.2	5,377.2	0.0
D	1,714	115	680	3.4	5,391.0	5,391.0	5,391.0	0.0
E	2,239	156	525	4.4	5,401.3	5,401.3	5,401.3	0.0
F	3,028	98	334	6.8	5,404.2	5,404.2	5,404.2	0.0
G	3,257	158	294	7.8	5,420.1	5,420.1	5,420.1	0.0
H	3,937	139	488	4.6	5,428.0	5,428.0	5,428.1	0.1
I	4,753	114	270	8.0	5,436.3	5,436.3	5,436.3	0.0
J	5,294	158	302	7.1	5,442.5	5,442.5	5,442.5	0.0
K	6,149	184	600	3.6	5,452.8	5,452.8	5,452.8	0.0
L	6,741	40	173	11.3	5,458.8	5,458.8	5,459.0	0.2
M	7,445	48	209	9.4	5,467.8	5,467.8	5,467.9	0.1
N	7,913	64	214	9.2	5,472.5	5,472.5	5,472.5	0.0
0	8,661	165	732	2.7	5,487.7	5,487.7	5,488.1	0.4
P	9,247	110	257	7.2	5,488.4	5,488.4	5,488.7	0.3
Q	9,445	60	205	8.9	5,496.7	5,496.7	5,496.9	0.2
R	10,722	49	171	10.6	5,505.1	5,505.1	5,505.1	0.0
S	11,413	50	199	5.2	5,513.9	5,513.9	5,514.4	0.5
T	11,996	40	120	8.7	5,523.8	5,523.8	5,524.1	0.3
U	12,725	20	82	11.5	5,533.1	5,533.1	5,533.2	0.1
V	13,326	46	114	8.2	5,545.0	5,545.0	5,545.6	0.6
W	13,845	40	115	8.2	5,551.5	5,551.5	5,552.0	0.5
X	14,614	30	94	10.0	5,562.9	5,562.9	5,563.1	0.2
Y	15,176	52	108	7.7	5,569.1	5,569.1	5,569.1	0.0
Z	15,558	30	112	7.4	5,572.3	5,572.3	5,572.8	0.5

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

SJCD 6200

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SJCD 6200 (cont'd)								
AA	16,217	34	94	8.9	5,583.6	5,583.6	5,583.6	0.0
AB	16,606	73	302	2.8	5,591.2	5,591.2	5,591.2	0.0
AC	17,103	53	92	7.5	5,597.1	5,597.1	5,597.1	0.0
AD	17,756	280	1,826	0.4	5,618.8	5,618.8	5,618.8	0.0
AE	18,365	71	85	5.8	5,622.7	5,622.7	5,622.7	0.0
AF	19,030	74	87	5.7	5,632.2	5,632.2	5,632.2	0.0
AG	19,641	44	189	2.6	5,644.6	5,644.6	5,644.6	0.0
AH	20,560	65	78	6.3	5,662.7	5,662.7	5,662.7	0.0
AI	21,319	38	73	7.9	5,676.8	5,676.8	5,676.8	0.0
AJ	21,889	109	118	4.9	5,693.4	5,693.4	5,693.4	0.0
AK	22,423	41	74	7.7	5,704.3	5,704.3	5,704.3	0.0
AL	23,183	40	60	7.0	5,715.3	5,715.3	5,715.3	0.0
AM	23,678	159	440	1.0	5,726.9	5,726.9	5,726.9	0.0

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

SJCD 6200

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SJCD 6200 NORTH TRIBUTARY								
A	91	103	165	6.4	5,399.9	5,399.9	5,399.9	0.0
B	834	59	239	4.4	5,408.5	5,408.5	5,408.5	0.0
C	1,382	118	165	5.5	5,425.3	5,425.3	5,425.3	0.0
D	1,855	67	109	6.4	5,432.9	5,432.9	5,433.0	0.1
E	2,614	64	94	6.4	5,444.1	5,444.1	5,444.1	0.0
F	3,366	79	103	5.8	5,454.2	5,454.2	5,454.2	0.0
G	3,879	204	379	1.9	5,463.4	5,463.4	5,463.4	0.0
H	4,327	40	89	8.5	5,465.4	5,465.4	5,465.4	0.0
I	5,170	53	99	7.6	5,478.6	5,478.6	5,478.6	0.0
J	5,872	80	342	1.2	5,490.2	5,490.2	5,490.4	0.2
K	6,423	35	56	7.3	5,493.2	5,493.2	5,493.2	0.0
L	6,856	31	74	5.6	5,500.4	5,500.4	5,500.4	0.0
M	7,648	27	74	5.5	5,515.3	5,515.3	5,515.3	0.0
N	8,014	30	54	7.6	5,523.5	5,523.5	5,523.5	0.0

[1] Feet above confluence with SJCD 6200

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

SJCD 6200 North Tributary

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SOUTH BRANCH HYLANDS CREEK								
A	130	59	258	11.4	5,283.7	5,283.9	5,283.9	0.0
B	640	52	285	10.3	5,290.0	5,290.0	5,290.8	0.8
C	1,300	60	355	8.3	5,296.6	5,296.6	5,297.1	0.5
D	1,800	63	217	8.1	5,302.2	5,302.2	5,302.3	0.1
E	2,410	69	255	6.9	5,308.1	5,308.1	5,308.1	0.0
F	3,270	75	257	7.4	5,319.8	5,319.8	5,320.6	0.8
G	4,000	86	229	7.7	5,330.5	5,330.5	5,330.5	0.0
H	4,600	88	246	7.2	5,338.0	5,338.0	5,338.3	0.3
I	4,820	284	656	2.7	5,352.4	5,352.4	5,352.4	0.0
J	5,300	309	696	2.5	5,353.3	5,353.3	5,353.3	0.0
K	5,450	775	2,652	0.7	5,361.5	5,361.5	5,361.5	0.0
L	6,040	138	235	7.5	5,364.9	5,364.9	5,364.9	0.0
M	6,550	75	299	5.9	5,369.6	5,369.6	5,369.6	0.0

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

South Branch Hylands Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SOUTH BRANCH RANCH CREEK								
A	660	339	271	2.3	5,319.6	5,319.6	5,319.6	0.0
B	1,000	257	2,085	0.3	5,320.0	5,320.0	5,320.0	0.0
C	1,390	91	306	2.0	5,320.3	5,320.3	5,320.3	0.0
D	1,830	74	110	5.7	5,325.0	5,325.0	5,325.0	0.0
E	2,340	35	68	8.0	5,341.9	5,341.9	5,341.9	0.0
F	2,970	55	93	5.9	5,357.6	5,357.6	5,357.6	0.0

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

South Branch Ranch Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SOUTH COTTON CREEK								
A	100	50	31	4.5	5,253.1	5,244.5 [2]	5,244.5	0.0
B	740	37	26	4.8	5,268.5	5,268.5	5,268.5	0.0
C	1,170	29	24	4.7	5,282.5	5,282.5	5,282.5	0.0
D	1,760	37	27	4.2	5,301.1	5,301.1	5,301.1	0.0

[1] Feet above mouth

[2] Elevation computed without consideration of backwater

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

South Cotton Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TANGLEWOOD CREEK								
A	1,450	140	568	1.6	5,185.6	5,185.6	5,185.7	0.1
B	2,550	71	153	4.9	5,194.6	5,194.6	5,195.4	0.8
C	3,656	34	105	6.3	5,212.5	5,212.5	5,213.4	0.9
D	4,860	65	87	6.6	5,232.5	5,232.5	5,232.5	0.0
E	5,720	45	84	6.1	5,249.5	5,249.5	5,249.5	0.0
F	6,240	52	79	6.5	5,259.3	5,259.3	5,259.4	0.1
G	6,620	256	1,720	0.3	5,277.3	5,277.3	5,277.3	0.0
H	7,380	75	77	5.1	5,283.9	5,283.9	5,283.9	0.0
I	8,120	34	49	6.9	5,304.5	5,304.5	5,304.5	0.0
J	8,600	132	60	5.6	5,323.3	5,323.3	5,323.3	0.0
K	8,760	184	317	0.9	5,324.0	5,324.0	5,324.0	0.0
L	9,280	18	38	6.6	5,330.2	5,330.2	5,330.2	0.0

[1] Feet above mouth
[2] Floodway located entirely in Adams County

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Tanglewood Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
VAN BIBBER CREEK								
A	1,734	155	1,176	2.6	5,361.5	5,361.5	5,361.5	0.0
B	2,015	106	653	4.6	5,361.9	5,361.9	5,361.9	0.0
C	2,315	106	660	4.6	5,362.4	5,362.4	5,362.4	0.0
D	2,742	56	250	12.0	5,363.6	5,363.6	5,363.6	0.0
E	3,139	113	1,266	5.4	5,373.5	5,373.5	5,373.5	0.0
F	3,626	33	739	12.7	5,375.6	5,375.6	5,375.6	0.0
G	3,832	28	784	11.7	5,377.0	5,377.0	5,377.0	0.0
H – J [2]	-	-	-	-	-	-	-	-
K	9,161	63	284	10.2	5,420.7	5,420.7	5,420.7	0.0
L	9,491	135	330	8.8	5,429.6	5,429.6	5,429.8	0.2
M	9,971	168	577	5.0	5,432.3	5,432.3	5,432.8	0.5
N	10,491	69	252	11.5	5,435.1	5,435.1	5,435.2	0.1
O	10,641	165	335	8.7	5,439.0	5,439.0	5,439.0	0.0
P	10,721	170	519	5.6	5,440.8	5,440.8	5,440.8	0.0
Q	10,786	190	633	4.6	5,441.0	5,441.0	5,441.0	0.0
R – CI [2]	-	-	-	-	-	-	-	-

[1] Feet above confluence with Ralston Creek
[2] Floodway not computed

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Van Bibber Creek

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
WALNUT CREEK								
A	9,050	96	312	4.8	5,351.6	5,351.6	5,351.9	0.3
B	11,870	150	258	4.2	5,370.3	5,370.3	5,370.5	0.2
C	13,410	82	247	4.9	5,383.6	5,383.6	5,383.6	0.0
D	14,320	77	182	6.6	5,391.6	5,391.6	5,392.2	0.6
E	15,120	59	231	5.2	5,398.2	5,398.2	5,398.5	0.3
F	15,950	66	111	9.4	5,405.3	5,405.3	5,405.8	0.5
G	17,000	100	300	3.5	5,413.8	5,413.8	5,414.5	0.7
H	18,550	90	129	8.2	5,421.2	5,421.2	5,421.7	0.5
I	20,100	53	119	4.2	5,432.5	5,432.5	5,433.4	0.9
J	22,050	47	122	4.1	5,445.1	5,445.1	5,446.0	0.9
K	23,460	55	53	8.2	5,457.7	5,457.7	5,458.6	0.9
L	24,850	70	81	5.3	5,472.1	5,472.1	5,473.0	0.9

[1] Feet above mouth

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JEFFERSON COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

Walnut Creek